Vol. XXXIII MARCH, 1923 No. 3

THE LARYNGOSCOPE

AN INTERNATIONAL MONTHLY JOURNAL
DEVOTED TO DISEASES OF THE

EAR - NOSE - THROAT

FOUNDED IN 1896 BY
DR. M. A. GOLDSTEIN, ST. LOUIS,
Managing Editor and Publisher.

Dr. A. M. Alden, St. Louis,
Associate Editor.

For Contents See Page 1.

Subscription, $6.00 per Annum, in Advance.

Foreign Subscription, 35 Shillings per Annum, Post Free.
Single Copies, 75 cents.

PUBLISHED BY THE LARYNGOSCOPE CO.
3858 Westminster Place, St. Louis, Mo., U. S. A.

FOREIGN OFFICE, BAILLIERE, TINDALL & COX,
8 HENRIETTA ST., STRAND, LONDON, ENG.

(Entered at the Postoffice at St. Louis, Mo., as Second-Class Matter, in July, 1896.)

Vol. 2 JANUARY, 1923 No. 1.

ORALISM AND AURALISM

A QUARTERLY JOURNAL
DEVOTED EXCLUSIVELY TO SPEECH PROBLEMS

EDITOR
MAX A. GOLDSTEIN, M. D.
St. Louis

COLLABORATORS:

C. S. BLUEMEL, M.A., M.D., Denver.
FRANK W. BOOTH, Omaha.
JULIA M. CONNERY, St. Louis.
A. L. E. CROUTER, LL.D., Mt. Airy, Pa.
ELBERT E. GRUVER, Council Bluffs, Ia.
HAROLD M. HAYS, M.D., New York.
ENFIELD JOINER, Trenton, N. J.
ELMER L. KENYON, M.D., Chicago.
MILDRED A. McGINNIS, St. Louis.
HARRIS TAYLOR, LL.D., New York.
JOHN DUTTON WRIGHT, New York.
CAROLINE YALE, LL.D., Northampton, Mass.

Subscription, $2.00 per Annum.
Single Copies, 50 cents.

PUBLISHED BY
THE LARYNGOSCOPE CO., ST. LOUIS.
Entered at the Postoffice at St. Louis, Mo., as Second-Class Matter, February, 1922

THE
LARYNGOSCOPE.

VOL. XXXIII ST. LOUIS, MARCH, 1923 No. 3

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

TRANSATLANTIC DEVELOPMENT OF RHINO-LARYNGOLOGY.*

DR. HERBERT S. BIRKETT, Montreal, Canada.

Permit me to express to the chairman and members of the Semon Lecture Board my sincere appreciation and thanks for the distinguished honor of having been invited to deliver this lecture, an honor which I feel has been conferred on the medical profession of Canada, and McGill University in particular, and that it is my proud privilege to represent both.

I desire to avail myself of this opportunity to pay a personal tribute to the memory of him in whose name this lecture is given. It is now over thirty years since I first met Sir Felix Semon, and during my many visits to this side of the Atlantic that acquaintance developed into a true and warm friendship. Sir Felix always impressed me as one who jealously guarded and strongly upheld the dignity of the specialty to which he had devoted his whole life. He was frank and decided in his opinions. As an investigator in the field of laryngology, and as a contributor to its literature, he stood pre-eminent.

The close ties existing between the English-speaking countries make it desirable that the one should know more of the history of the development of the specialty in the other than so far has been the case.

"When all has been said it would appear that to the United States belongs the credit of the birth of Laryngology, and no small share in the discovery and development of those fundamental principles

*The Semon Lecture of the University of London delivered at the Royal Society of Medicine on July 12, 1922.

which have placed it as a specialty in the foremost rank of scientific medicine. It is well, therefore, that we should trace the beginnings of our science in this country and recount the contributions which it has made to the laryngology of today. Both the origin of the specialty and the conception and development of its most important principles, have been the products of the splendid, speculative and inventive genius of our American colleagues."[1]

"To our American confreres, past and present, much credit is due, not only for pioneer work, but also for the persistent way they have kept the laryngological flag flying."[2]

HISTORY OF THE INTRODUCTION OF THE LARYNGOSCOPE.

In America the first knowledge of the nature and uses of the laryngoscope introduced by Garcia in 1855, was communicated to the medical profession by Hugo Stangenwald, who, in a communication before the New York Medico-Chirurgical College on June 14, 1860, read a description of the instrument.[3]

At a meeting of the New York Academy of Medicine held on March 6, 1861, Ernest Krackowizer made the statement that he "was the first person in America who had seen the vocal cords in a living subject," by means of a laryngoscope which he had received from Vienna in 1858.[4] It is also recorded that in 1858 Ephraim Cutter made an unsuccessful attempt to examine the larynx by means of prisms contained in a double tube, one tube being for illumination and the other for observation.[5] Other early records of the examination of the larynx with the laryngoscope are to be found, such as that of Abraham Jacobi, who states in his "History of Pediatrics in New York" that in 1856 he had a mirror made with which he examined the larynx of one of his patients.[6] G. Troup Maxwell also claims to have had a laryngeal mirror made in 1859, with which he not only examined the larynx, but carried out local treatment.[7] The statement is made by Jacobi and by Maxwell, individually, that they did not realize the importance of this particular discovery at the time, and only placed it on record many years after.

At this time there appeared also several papers on the use of the laryngoscope.

In 1862 E. Wagner of New York published an article on "Laryngoscopy and Rhinoscopy," which appeared in the *Oesterreische Zeitschrift fur Praktische Heilkunde*, 1862, No. 5; and in November of the same year Louis Elsberg reviewed Czermak's essay "On the Practical Uses of the Laryngoscope."[8]

Whilst the practical use of the laryngoscope at this period was regarded with more or less scepticism, the possibilities of it were

foreseen by one whom I think we might rightly describe as the father of laryngology, Horace Green, who, after the demonstration of the instrument in 1861, made the following statement:

"If that instrument can be brought into general use, I am confident that the profession will be able to cure diseases which are now too frequently overlooked."[9]

TWO PIONEERS.

Green was born in 1802 of Revolutionary parentage. He graduated in medicine in 1834 and in 1836 he moved to New York, where he practiced as a lung and throat specialist until his death (from tuberculosis) in 1866.[10] He had visited the clinics of the French teachers, more particularly those of Trousseau and Belloc, and returned to New York full of enthusiasm for the possibilities of the laryngoscope. He was the first to devote himself exclusively to diseases of the respiratory tract. In addition to two notable papers, one in 1849 on "The Pathology and Treatment of Croup," and the other in 1852 on "The Surgical Treatment of Polypi of the Larynx and Edema of the Glottis," Green had already published in 1846 a book entitled, "A Treatise on Diseases of the Air Passages, comprising an Inquiry into the History, Pathology, Causes and Treatment of Those Affections of the Throat called Bronchitis, Chronic Laryngitis, Clergyman's Sore Throat, etc." The book reached a third edition. Certain statements made by the author claiming priority in the making of topical applications to the larynx, were the cause of a very acrimonious and unpleasant discussion, the character and nature of which may be readily understood by referring to the articles which appeared in the *Boston Medical and Surgical Journal* of 1846-47. It was, however, according to Elsberg, definitely settled that "the name of Horace Green is inseparably and most honorably connected with the history of topical medication of the larynx; and his methods and success will ever remain a brilliant monument of his intrepidity, perseverance and skill."[11]

Associated with Green in the development of Transatlantic laryngology must be mentioned the name of Louis Elsberg, whom Cohen described as "the most accomplished laryngologist in America." He was born in 1836 and graduated at Jefferson Medical College, Philadelphia, in 1857. More than anyone else Elsberg was active in drawing attention in America to the importance of the laryngoscope, and he contributed a large number of valuable scientific papers. Elsberg's attention had been attracted and his ardor stimulated by Czermak, who had sent him his book. These studies and observations he brought, in 1863, before the New York Academy of Medicine and the American Medical Association. He also invented many

useful laryngological instruments, such as a brush, sponge-carrier, porte-caustic, fumigation tube and electropole.[12]

Elsberg, with a few others, notably F. H. Davis of Chicago, founded the American Laryngological Association and was its first president.

THE TONSILLOTOME.

Two important inventions of the tonsillotome should not be left unmentioned. We are indebted to Philip Syng Physick for the first introduction, in 1828, of the tonsillotome. This instrument was originally used as a uvulatome, but under his direction the same idea was carried out on a larger scale and the instrument adapted for the removal of tonsils.[13] In 1832, William B. Fahnestock of Lancaster, Pennsylvania, invented a tonsillotome on the ring-knife principle, with a needle for drawing the tonsil out of its bed.[14]

LARYNGOLOGICAL LITERATURE.

Before the introduction of the laryngoscope in America, the early medical literature contains passages in which diseases of the throat are described and treatment outlined. The earliest account of diseases of the throat was given by John Josselyn, in his work entitled: "An Account of Two Voyages to New England," made during the years 1638 and 1663, in which he states that "they (the inhabitants) are troubled with a disease in the mouth and throat which hath proved mortal to some in a very short time, and to quinsies and impostumations of the almonds and great distempers of cold."[15] Captain Morton in his "New England Memorial," in 1650, draws attention to similar occurrences.[16] The description given in both of these works correspond with diphtheria.

In 1736, William Douglas published an essay entitled, "The Practical History of a New Epidemical Eruptive Miliary Fever, with an Angina Ulcusculosa, which Prevailed in Boston, New England, in the Years 1735 and 1736." This article also evidently describes an epidemic of diphtheria.

From this period onwards little record is left describing throat conditions until 1771, when Samuel Bard published a very concise treatment on diphtheria under the title, "An Enquiry into the Nature, Cause and Cure of the Angina Suffocativa, or Sore Throat Distempers." Bard gives a very careful, accurate and graphic description of what we now know to be diphtheria involving the skin, mucous membrane and larynx. In 1774 this disease was again described by Jacob Ogden as "The Throat Distemper." Later, Christian F. Michaelis wrote an exhaustive treatise on croup, and in 1787 a curious manuscript entitled "A Therapeutic Alphabet," or "Pocket Dictionary of Medicine, Midwifery and Surgery," was written by

Matthew Wilson, a clergyman, who was born in Chester county, Pennsylvania, in 1734, and died in 1790. This manuscript was never printed and is reviewed by S. A. Friedberg under the title of "Laryngology and Otology in Colonial Times."[17] The prevalence and importance of the different laryngological and otological diseases at this time may be judged by the amount of space devoted to their description, and the epidemics which are here described were evidently diphtheria and quinsy.

The earliest classical textbook of special interest to laryngology was the work produced by Samuel D. Gross, entitled, "A Practical Treatise on Foreign Bodies in the Air Passages," published by Blanchard and Lea, Philadelphia, in 1854. Gross was the first to show why foreign bodies more frequently find their way into the right bronchus, owing to the anatomical arrangement of the septum of the bifurcation of the trachea.

With the introduction of the laryngoscope the literature increased rapidly, Elsberg himself contributing a large number of papers. A monumental piece of work which he compiled is the "Bibliography of Laryngology" from the year 1809 to 1878, and from a perusal of this one may gather that America contributed a great deal of valuable work.

In 1864, Elsberg published (William Wood & Co.) a little monograph on "Laryngeal Medication," the first Trans-Atlantic work on (mirror) laryngology, and in the year following he published an essay on "The Surgical Treatment of Morbid Growths Within the Larynx," which won a prize presented by the American Medical Association.[18] This classical work deals with the fatality of the affection and the modern triumph over it through the introduction of the laryngoscope, the operations heretofore practiced and the surgical treatment of these affections at that time, and shows that "he quickly realized and took advantage of the possibilities of the laryngoscope, not only as a means of examining and operating upon the hitherto hidden larynx, but an easy and practical method for obtaining fresh pathological tissues for study."

"His interest in the study of this material was not merely for diagnostic purposes, but a much broader interest: the origin and development of tumors. In this essay he describes in detail and illustrates the microscopical findings in a tumor removed from the larynx of a young woman, which he said was the largest one observed up to that time. With a lens that magnified but 200 times, we find him carefully studying unstained sections with the hope that he might throw some light upon one of the important questions of his time as well as our own—the histogenesis of tumors. He

proved to his own satisfaction that the epithelium of the tumor studied arose from the differentiation of the so-called connective tissue corpuscles. Fourteen years later he is again at work on the same problem and reports his findings in an article entitled, "Microscopical Study of Papilloma of the Larynx."[19] At this time more powerful lenses were available and stains for sections were in use and he was quick to avail himself of them. This article shows that he had not only a deep interest in pathology, but a detailed knowledge of the literature. We cannot today accept all his findings as true, yet they show us what manner of man he was. He, though a practitioner, was not afraid to attack so obscure and complicated a subject as the histogenesis of tumors, but brought to bear upon it a well trained and analytical mind."*

Following Elsberg, J. Solis Cohen "began a long series of communications, which have done so much to establish the specialty of laryngology in America and to stimulate its steady advance for nearly forty years."[20] In 1866 and 1867 Cohen gave very elaborate and detailed accounts of the method of using the laryngoscope; describing very accurately the instrument itself, the methods of illumination and the anatomical structures to be seen. In connection with this subject, the anatomy of the larynx,[21] it is to be noted that in 1848 Joseph Leidy, professor of Anatomy in the University of Pennsylvania, independently described the elastic membrane of the larynx, though after writing the article Leidy found that in 1845 Lauth had already described it.[22]

It was in 1877 that J. Solis Cohen made an epochal advance in the surgery of the larynx when he performed total extirpation for adenoma-carcinoma (of the larynx) and adopted the method, original with him, of attaching the free end of the trachea to the skin in the middle of the neck.[23] The first complete treatise on diseases of the throat ever published, either in the United States or abroad, is that by J. Solis Cohen, published in 1872, "A classical production which for thorough comprehensiveness and originality, wide and well digested clinical knowledge, gained by close and intelligent observation from an almost unlimited clinical experience, exhaustive acquaintance with the literature of the subject, and sound practical common sense, was pre-eminent for many years, and in the light of its time has never been surpassed."[24] Clinton Wagner published a small book in 1884; E. Fletcher Ingals a book embracing diseases of the chest with those affecting the throat and the nasal cavities in

*I am indebted to Dr. Lawrence J. Rhea, Associate Professor of Pathology, McGill University, for the above statement regarding Elsberg's pathology.

1890; F. H. Bosworth, two large volumes on "Diseases of the Nose and Throat," in 1889; and E. L. Shurley, a book on "Diseases of the Nose and Throat," in 1900. Other valuable contributions to the literature of laryngology are those of Franklin H. Hooper of Boston, concerning the tension of the vocal cords,[25] and the anatomy and physiology of the recurrent laryngeal nerve.[26]

The earliest laryngeal conditions met with in practice were evidently growths either benign or malignant, and as early as 1852 Horace Green referred to them as follows: "Foreign growths have occurred in the opening of the air passages, in many instances where their presence was neither suspected nor discovered; and if the attention of the profession should by any means be directed to this subject, it will be found that the existence of polypus and other excrescences in these passages is an occurrence taking place much more frequently than has been supposed by medical practitioners." Again: "There remains not a doubt, that in many instances these morbid growths have existed unobserved during life and, having proved suddenly fatal, have remained undetected after death."[27]

EMINENT OPERATORS.

One must pass in brief review certain laryngeal work done by eminent surgeons who did much to advance the surgery of certain diseases of the larynx. The first reference in American literature is to a case of papillomata of the vocal cords described in 1817 by John C. Cheeseman, in a child dying without relief.[28] In 1845, Horace Green removed a pedunculated tumor from the larynx by pressing the tongue down and thus bringing the epiglottis into view, and when the patient coughed, the polyp was caught by a slender double hook and removed by a probe-pointed knife.[29] Laryngo-fissure, or laryngotomy, as it then was called, without tracheotomy for removal of laryngeal growths was first performed in America by Ephraim Cutter of Boston in 1866.[30] Gurdon Buck of New York, in 1851, however, performed laryngo-fissure with tracheotomy for an extensive intra-laryngeal growth,[31] and as early as 1846 his thoughts were directed to means of relieving a condition of edematous laryngitis, and in 1847, he began to practice scarifications of the edematous edges of the glottis, as well as the epiglottis, which method he maintained was first independently introduced by him.[32] For these and other advancements which he made in the surgery of this special region, and which were original, practical and brilliant, he may rightly be regarded as a pioneer in intra-laryngeal surgery.

In 1876 Lefferts was the first in America to recognize eversion of the laryngeal ventricles and to operate upon a case successfully by laryngo-fissure with tracheotomy;[33] but Elsberg, in 1882, reported

that he had operated by the indirect method upon a patient with a similar condition as early as 1866.[34]

LARYNGOLOGICAL SOCIETIES, LECTURES, AND JOURNALS.

Special laryngological societies were first formed in America. The one first established was known as the New York Laryngological Society, and was founded on October 13, 1873, by Clinton Wagner. Its object was stated to be "The Study of Affections of the Larynx, Pharynx and Adjacent Parts." This society, however, did not last long and was merged into the Section of Laryngology of the New York Academy of Medicine. In 1878, at a meeting held in Buffalo, a number of physicians, who had identified themselves for some years past with laryngology, met together and decided to form a national association "for the advancement of the special department of surgery in which they were chiefly interested." As a result of this meeting the American Laryngological Association was founded, and the first official meeting was held in the city of New York on June 10, 11 and 12 the following year, under the presidency of Louis Elsberg.[35] [36]

The first official teaching in laryngology was, according to records, inaugurated by J. Solis Cohen, in Philadelphia, in 1866, and by H. K. Oliver at the Harvard Medical School about the same time.

Elsberg, however, in his presidential address at the first meeting of the American Laryngological Association, in 1879, stated that in the autumn of 1861 he commenced lecturing on laryngology in the Medical Department of the City of New York University, and that this was the first regular instruction given on this subject in America, and that two years later the medical faculty of the university established a laryngological clinic, which was the first public throat clinic in America, and perhaps in the world.[37] The Metropolitan Throat Hospital of New York was established in 1874 by C. Wagner, Asch and Lefferts. In 1875 the Harvard Medical School included laryngology in its curriculum, as also did the New York College of Physicians and Surgeons. In 1883, a special department for the treatment of diseases of the throat was opened in the New York Eye and Ear Infirmary, and from this time onwards clinics and chairs were established in various transatlantic universities.

Other admirable journals devoted to this specialty are: *The Annals of Otology, Rhinology and Laryngology*, which was founded in 1892, and THE LARYNGOSCOPE, founded in 1896.

The first journal devoted entirely to the specialty of laryngology was the *Archives of Laryngology*, edited by Louis Elsberg, J. Solis Cohen, Frederick I. Knight and George M. Lefferts, in 1880. This

journal was a marvel of production, but unfortunately only lived to have four volumes published.

An interesting and original method of reporting progress in this science was that begun in 1874, in the *New York Medical Journal*, by George M. Lefferts, in a series of abstracts which he contributed from time to time.

PHOTOGRAPHY, INTUBATION, AND BRONCHOSCOPY.

Thomas R. French was the first to obtain *satisfactory* photography of the larynx, in 1882,[38] although Ephraim Cutter attempted to do so in 1865.[39] Of French's work it has been said that it was a "triumph of ingenuity, skill and persistence, which resulted in upsetting many of the ideas conceived, not only by the early investigators, but much also which had been advanced since the introduction of the laryngoscope." [40]

The most epoch-making advance in laryngology was made, I think, when Joseph O'Dwyer, without knowledge of the unsuccessful efforts of Bouchut in 1858, gave intubation to the profession. It is worthy of note that, from the foundation of the New York Foundling Hospital in 1869 to the inception of O'Dwyer's experiments in 1880, not a single case of tracheotomy for croup recovered, and it was this failure of tracheotomy to give any encouraging results which prompted him in 1880 to begin his long and tedious work, which culminated in 1885 in producing an intubation tube which has stood the test of time in overcoming not only the acute[41] but also the chronic[42] forms of stenosis of the larynx. Fully to appreciate his work one should read his presidential address on "The Evolution of Intubation." [43]

The subject of intubation brings us to an allied one. It seems, from O'Dwyer's work, that he would probably have originated the idea of bronchoscopy, for he had already recognized the inevitable disaster of a foreign body in a bronchus remaining unremoved, and had constructed a special tube with a thin wall and a calibre as large as possible, for the purpose of facilitating the expulsion of a foreign body in the trachea or in a bronchus. Those who did much to advance bronchoscopy in America, and were the first to remove foreign bodies by this method, are A. Coolidge, Jr.,[44 45] and E. Fletcher Ingals.[46 47]. Fletcher Ingals performed his operation on March 24, 1904, and Coolidge his on May 12 of the same year. Ingals' contributions to the subject of bronchoscopy are numerous, and show intuitive knowledge and inventive skill, and to him is due the credit of being the first to make use of the distal method of illumination.[48] It is, however, to Chevalier Jackson that great credit must be given for the subsequent trans-atlantic development and

perfecting of this recent art. Jackson produced the first book devoted entirely to the subject of bronchoscopy, which was published in 1907; his second book, a most extensive and comprehensive one, appeared in 1914.

RHINOLOGY.

Laryngology received its impetus at a comparatively early period through the introduction of the laryngoscope, yet its sister specialty, rhinology, in spite of the means then at its disposal, was considerably slower in its development, and it was only the large number of contributions to the literature of the subject by Americans which enabled it to make any encouraging advance on that continent.

It is interesting to note that the importance of nasal respiration, and the disastrous effects of mouth breathing, were first noted by a layman, George Catlin, and the results of his observations, after a very long period spent amongst the Indians of both North and South America, are contained in a book published by him as early as 1861, from which the following paragraph is extracted:

"When I have feen a poor Indian woman in the wildernefs, lowering her infant from the breaft, and preffing its lips together as it falls afleep in its cradle in the open air, and afterwards looked into the Indian multitude for the refults of fuch a practice, I have faid to myself—'glorious education! fuch a mother deferves to be the nurfe of emperors.' And when I have feen the *careful, tender mothers* in civilized life, covering the faces of their infants fleeping in overheated rooms, with their little mouths open and gafping for breath; and afterwards looked into the multitude, I have been ftruck with the evident evil and lafting refults of this incipient ftage of education; and have been more forcibly ftruck and fhocked when I have looked into the Bills of Mortality, which I believe to be fo frightfully fwelled by the refults of this habit, thus contracted and practifed in contravention to nature's defign." [49]

Catlin also draws attention to the injurious effects of mouth breathing in producing nasal polypi, quinsy, asthma, diseases of the lungs, irregularity of the teeth.

Contributions to the early literature of rhinology consisted merely of the reporting of cases without any new theories being set forth.

The correction of certain conditions of the nasal mucous membrane was attempted by Horace Green and his contemporaries, by the method of syringing the nasal passages, and the year 1866 saw the introduction of the nasal spray by J. Solis Cohen.[50] This method was further improved by Thomas Rumbold during that year[51] and perfected by the addition of compressed air in 1872 by Louis Sass.

The study of the diseases of the nose, which up to the year 1874 had been given but scant attention, received a great impulse from the work of Morris Asch, John N. MacKenzie, Bosworth, Clinton Wagner, Beverley Robinson, and Lefferts, whose chief efforts were directed towards the removal of obstructions to nasal respiration. They gave most of their attention to correcting chronic hypertrophy of the turbinated bodies, by means of the application of astringents or acids, the insufflation of powders, the introduction of cylindrical sponge-tents, of soft metal or medicated bougies, the galvano-cautery,[52] or by the snare, introduced by Jarvis.[53] The next step in removing nasal obstructions was directed to the correction of abnormal conditions of the septum. In 1878 J. Solis Cohen was the first to remove intra-nasal bony obstructions by means of the dental engine,[54] and in 1879 D. H. Goodwillie introduced his multiple revolving knives, nasal drills and burrs to attain the same object.[55]

An improvement upon the methods then in vogue of correcting septal deviations by crushing methods, as devised by A. J. Steele or Asch, was brought out in 1882 when E. Fletcher Ingals first performed the operation of resection, which consisted in incising the mucous membrane, carefully reflecting it from the underlying cartilage, then *removing the deviated portion*, replacing the flap and retaining it in position by sutures.[56]

In 1887 Francke H. Bosworth introduced his nasal saw for the removal of spurs and ecchondroses.[57] The name of John O. Roe will always stand out prominently for his brilliant and original methods in his work of correcting external nasal deformities.[58 59]

In connection with hay-fever, W. H. Daly was the first to call attention, in 1882, to the clinical connection between hay-fever and nasal diseases.[60] John C. Roe, in 1883, first explained the relation of cause and effect between hay-fever and nasal diseases through the correlation of the vaso-motor or the sympathetic nervous system, and pointed out the value of the galvano-cautery in the treatment of nasal disease.[61 62]

To John MacKenzie belongs the credit for having drawn the attention of the profession to the fact "that in the nose there exists a definite, well-defined sensitive area, whose stimulation, either through a local pathological process, or through the action of an irritant introduced from without, is capable of producing an excitation which finds an expression in a reflex act, or in a series of reflected phenomena." MacKenzie began his investigations in 1879 and the results were published in 1883,[63] fourteen years before Fleiss, whose investigations were published in 1897.

Edgar Holden in 1867 drew attention to the sympathetic connection between affections of the uterus and the pharynx and larynx.[64]

Acute and chronic inflammatory conditions of the nasal accessory sinuses received but little attention in the earlier years of the specialty, and it was W. H. Daly who, in 1882, brought prominently before the medical profession affections involving especially the antrum.[65] For this and other work he "may justly be regarded as a founder of that surgical school of rhinology in America, which has at the present day so many distinguished representatives, by drawing forcible attention to the importance of intra-nasal surgical treatment."[66] Daly's work immediately excited further investigation into the subject of nasal accessory sinus disease, and the interest of the profession was constantly stimulated by the many early and valuable contributions of J. H. Bryan. It was in 1893 that operative measures for the cure of chronic suppurative conditions of the antrum were placed on a definite basis through the operation introduced simultaneously by G. W. Caldwell of New York[67] and by Luc of Paris.

THERAPEUTIC MEASURES.

A new epoch was born through the discovery of the anesthetic properties of cocain, when Carl Koller of New York, whilst pursuing his studies in Vienna and carrying out further investigations, made known his discovery at a meeting of the Ophthalmological Society at Heidelberg in September, 1884,[68] and it was at his suggestion that it was tried in the field of rhinology and laryngology.

An important use of this drug was first noted by Francke H. Bosworth, who, in 1884, drew attention to the practical value of the contractile power of cocain when applied to the mucous membrane of the nasal cavity.[69]

The next epoch-making event in therapeutic measures was the discovery made known in 1896 by W. H. Bates of New York, an oculist, of the value of extract of the suprarenal capsule as a hemostatic[70] from observations he had made two years previously. This discovery soon found its application as a valuable adjuvant in controlling bleeding, particularly in nasal operations. The active principle of suprarenal capsule was discovered in 1897 by John J. Abel and A. C. Crawford, and called by them epinephrin,[71] and by Jokichi Takamine, who termed it adrenalin.[72] The first publication on the clinical use of adrenalin in rhinology was written by Emil Mayer.[73]

THE TEACHING OF RHINOLOGY AND LARYNGOLOGY.

Undergraduate teaching: The subjects of rhinology and laryngology have for many years been compulsory in the undergraduate medical curricula of most of our leading universities. The instruc-

tion, systematic as well as clinical, is usually given in the final year, and at the termination of the session an examination, both written and oral, is conducted by the head of the department and a minimum of 50 per cent of the marks must be obtained. The provincial qualifying boards of Canada, as well as the majority of the state licensing bodies of the United States, require that an examination shall be passed in these special subjects.

Post-graduate teaching: In the United States of America post-graduate teaching was first instituted in the city of New York in 1877, chiefly owing to the efforts of Bulkley, Satterthwaite and Lefferts, who established regularly organized instruction in the Demilt Dispensary, the most important dispensary at that time.[74] Once introduced, post-graduate teaching greatly assisted in advancing educational methods and in supplying a need which hitherto had not been met.

From this beginning it has greatly increased, so that at the present time some of the leading medical centres have their own separate and distinct post-graduate institutions, in which excellent facilities and opportunities are afforded in this special line of work.

THE EDUCATION OF THE SPECIALIST.

As early as 1879 Elsberg realized that it required years of special study to obtain a thorough knowledge of laryngology[75] and in the United States a great deal of time and thought have been given to the question of the education of the specialist. A committee appointed to consider the matter has finally drawn up recommendations which have been adopted by the American Laryngological Association, the American Otological Society, the Section of Oto-Laryngology of the American Medical Association, and the American Laryngological, Rhinological and Otological Society, and the Academy of Ophthalmology and Oto-Laryngology. Briefly, the recommendations are as follows:

1. Students preparing for the practice of oto-laryngology must be graduates of a first class (Class A)* medical school and should have completed a year's service as resident officer in an approved general hospital.

2. The minimum training shall consist of eighteen months' full time work, one-half of each day to be devoted to the clinical study of cases, the other half to the study of the fundamental sciences and library work.

3. All this work must be on the basis of genuine graduate instruction, where the student does his work individually under proper supervision.

*According to the classification adopted by the educational committee of the Rockefeller Foundation.

4. The work in the fundamental sciences must be carried out in well equipped laboratories, such as exist in all first-class (Class A)* medical schools. The clinical work must be done in a suitably equipped and properly organized special out-patient department of a large general hospital or special hospital, the student serving as clinical assistant.

5. Upon the completion of the first year's fundamental training, the student should obtain a position as resident officer in a special hospital or in the special department of a general hospital.[76]

The early trans-atlantic custom was to united otology and ophthalmology, but with the development of laryngology all three specialties were in many instances combined, and even at the present day in many of the small centres it is not uncommon to find the four specialties being practiced by one individual. But as far back as 1887 an attempt was made by W. H. Daly[77] to dissociate laryngology and otology from ophthalmology, and to unite otology and laryngology in accordance with their natural affinities. This idea has been continued and for the past twenty years laryngology and otology have, in most medical schools, become united under one chair, although in some the two subjects are still taught from separate chairs.

CONCLUSION.

In looking back over the broad outlines of the history of the trans-atlantic development of rhino-laryngology, one cannot but be impressed by the amazing strides which have been made in this specialty, particularly during the past seventy years. Previously its possibilities of developing into an important and distinct department were not fully realized, but once the avenues of research and investigation were opened up in the light of modern scientific developments, one discovery followed fast upon another, each experience an arch where through gleamed ever-widening fields of investigation. It was for the seekers of two generations ago to blaze the trail, whilst the succeeding generations have put into practice and brought to the present state of development the great ideas which had been set forth.*

REFERENCES.

1. DELAVAN, D. B.: Trans. Amer. Laryng. Assoc., 1918, Vol. 40, pp. 151, 152.

2. "The Rise and Progress of Laryngology," by Sir. Wlliam Milligan, M.D., C.M., *British Med. Journ.*, 1922, April 8th, p. 549.

*I desire to express my warmest thanks to Dr. D. Bryson Delavan of New York, Lieut-Col. F. H. Garrison of the Surgeon-General's Library, Washington, and to Dr. W. W. Francis of Montreal, for their valuable assistance in the preparation of this paper; also to Miss Cameron and Miss Davidson of the Medical Library, McGill University, for their kind help in the research work.

3. *Amer. Med. Monthly and New York Review*, 1860, July, Vol. 14, p. 15.
4. Bulletin of the New York Academy of Medicine, Vol. 1, p. 162.
5. "A Contribution to the History of Laryngology," by Louis Elsberg, M.D., Archives of Laryng., 1883, Vol. 4, p. 122.
6. Archives of Pediatrics, 1917, Vol. XXXIV, p. 4.
7. "The Laryngoscope, an American Invention," by G. Troup Maxwell, M.D., *Med. Record*, 1873, Vol. VIII, p. 28.
8. *Amer. Med. Monthly*, Vol. 18, p. 386.
9. Bulletin New York Academy of Medicine, Vol. 1, p. 162.
10. Encyclopædia of Amer. Med. Biography, Howard A. Kelly, 1912, Vol. 1, p. 359.
11. "On the Topical Medication of the Larynx and Neighboring Organs Under Sight," by Louis Elsberg; Trans. New York Academy of Medicine, 1863, Vol. 2, pt. XII p. 451.
12. "On the Topical Medication of the Larynx and Neighboring Organs Under Sight," by Louis Elsberg; Trans. New York Academy of Medicine, 1863, Vol. 2, pp. 426, 427.
13. Amer. Journ. Med. Sciences, 1828, Vol. I, p. 262.
14. Amer. Journ. Med. Sciences, 1832, Vol. XI, p. 249.
15. "An Account of Two Voyages to New England," by John Josselyn London, 1694. The Massachusetts Historical Society Collections, Third Series, Vol. VIII.
16. ELSBERG, LOUIS: Trans. Amer. Laryng. Assoc., 1879, Vol. 1, pp. 37, 38.
17. FRIEDBERG, S. A.: Annals of Medical History, 1917, Vol. 1, No. 1, p. 86.
18. ELSBERG, LOUIS: Trans. Amer. Med. Assoc., 1865, Vol. 16, p. 653.
19. Archives of Laryngology, 1880, Vol. 1, p. 1.
20. History of Laryngology and Rhinology, by J. Wright, 1914, p. 211.
21. COHEN, J. SOLIS: *Medical Record*, 1866-67, Vol. 1, pp. 228, 538.
22. LEIDY, JOSEPH: *Amer. Journ. Med. Sciences*, 1846, New Series, Vol. 12, p. 141.
23. COHEN, J. SOLIS: *New York Med. Journ.*, 1892, Nov. 12th, Vol. 56, p. 534.
24. DELAVAN, D. B.: Trans. Amer. Laryng. Assoc., 1918, Vol. 40, p. 156.
25. HOOPER, F. H.: Trans. Amer. Laryng. Assoc., 1883, Vol. 5, p. 118.
26. HOOPER, F. H.: Trans. Amer. Laryng. Assoc., 1886, Vol. VIII, p. 22, and 1887, Vol. IX, p. 41.
27. "On the Surgical Treatment of Polypi of the Larynx and Edema of the Glottis," by Horace Green, A.M., M.D., New York, John Wiley, 1859, Preface.
28. Trans. of the Physico-Medical Society of New York, 1817, Vol. I, p. 413.
29. "On the Surgical Treatment of Polypi of the Larynx and Oedema of the Glottis," New York, John Wiley, 1859.
30. CUTTER, EPHRAIM: *Amer. Journ. Med. Sciences*, 1867, Vol. LIII. p. 138.
31. "On the Surgical Treatment of Morbid Growths Within the Larynx," by Gurdon Buck, Trans. Amer. Med. Assoc., 1853. Vol. VI, p. 509.
32. "Oedematous Laryngitis," by Gurdon Buck, Trans. Amer. Med. Assoc., 1848 Vol. 1, p. 135.
33. *Medical Record*, 1876, Vol. 2, p. 359.
34. ELSBERG, LOUIS: Archives of Laryngology, 1882, Vol. III, p. 67.
35. Trans. Amer. Laryng. Assoc., 1879, Vol. I, p. 33.
36. Trans. Amer. Laryng. Assoc., 1918, Vol. XL, p. 166.
37. Trans. Amer. Laryng. Assoc., 1879, Vol. I, p. 86.
38. FRENCH, T. R.: Trans. Amer. Laryng. Assoc., 1882, Vol. 4, p. 32. and 1883, Vol. 5, p. 59.
39. CUTTER, EPHRAIM: Archives of Laryngology, 1882, Vol. 3, p. 223.
40. WRIGHT, J.: History of Laryngology and Rhinology, 1914, p. 191.

41. O'Dwyer, Joseph: *New York Med. Journ.*, 1885, Aug. 8th, Vol. 42, p. 145.
42. O'Dwyer, Joseph: *New York Med. Journ.*, 1888, Vol. 47, p. 255.
43. O'Dwyer, Joseph: "Evolution of Intubation," Presidential Address, Amer. Pediatric Soc. Trans., 1896, Vol. 8, p. 10.
44. Coolidge, A. junr.: "The Extraction of Foreign Bodies from the Bronchi," etc. *Boston Med. and Surg. Journ.*, 1904, October 13th, Vol. 151, p. 395.
45. Trans. Amer. Laryng. Assoc., 1904, Vol. 26, p. 111.
46. Ingals, E. Fletcher: "Oesophagoscopy and Bronchoscopy," etc. Journ. Amer. Med. Assoc., 1904, Nov. 19th, Vol. 43, p. 1514.
47. Trans. Amer. Laryng. Assoc., 1904, Vol. 26, p. 97.
48. Ingals, E. Fletcher: "Oesophagoscopy and Bronchoscopy," etc., Journ. Amer. Med. Assoc., 1904, Vol. 43, p. 1514.
49. "The Breath of Life or Mal-Respiration," by George Catlin, New York, 1861. Published by John Wiley, 1st edition, pp. 16 and 17.
50. Cohen, J. Solis: *Medical Record*, 1866-1867, Vol. 1, p. 147.
51. Trans. Amer. Laryng. Assoc., 1879, Vol. 1, p. 222 (footnote).
52. *New York Med. Journ.*, 1874, Vol. XIX, p. 422.
53. Trans. Amer. Laryng. Assoc., 1880, p. 130.
54. Cohen, J. Solis: *Med. and Surg. Reporter*, 1878, July 13, Vol. XXXIX, p. 30.
55. Goodwillie, D. H.: *Med. Record*, New York, 1879, July 5th, Vol. XVI, p. 28.
56. Ingals, E. Fletcher: Trans. Amer. Laryng. Assoc., 1882, p. 61.
57. Bosworth, F. H.: *Medical Record*, 1887, Jan. 29th, Vol. 31, p. 115.
58. "The Deformity Termed 'Pug-Nose' and Its Correction by a Simple Operation," by John O. Roe, M. D., *Medical Record*, New York, 1887, June 4th, Vol. XXXI, p. 621.
59. "The Correction of Angular Deformities of the Nose by a Subcutaneous Operation," by John O. Roe, M.D., *Medical Record*, New York, 1891, July 18th, Vol. XL, p. 55.
60. Daly, W. H.: Archives of Laryngology, 1882, Vol. III, p. 157.
61. "The Pathology and Radical Cure of Hay-Fever, or Hay Asthma," by John O. Roe, *New York Med. Journ.*, 1883, May 12th, Vol. 37, p. 509.
62. "Hay-Fever," by John O. Roe, Trans. Amer. Laryng. Assoc., 1887, Vol. 9, p. 117.
63. MacKenzie, J. N.: *Amer. Journ. Med. Sciences*, 1883, New Series, Vol. 86, p. 106.
64. Holden, Edgar: *New York Med. Journ.*, 1877, April, Vol. XXV, p. 386.
65. Daly, W. H.: "Naso-Antral Catarrh and Its Treatment," Archives of Laryngology, 1882, Vol. III, p. 314.
66. Editorial, *Journ. Laryng. and Rhinol.*, 1887, Aug., Vol. 1, p. 317.
67. Caldwell, G. W.: *New York Med. Journ.*, 1893, Vol. LVLLL, p. 526.
68. "Ueber die Verwendung des Cocain zur Anæthesirung am Auge," *Wiener Medizinische Blatter*, 1884, Nr. 43, p. 1352.
69. Bosworth, F. H.: *Medical Record*, 1884, Vol. XXVI, p. 533.
70. "The Use of Extract of Suprarenal Capsule in the Eye," by W. H. Bates, M.D., *New York Med. Journ.*, 1896, Vol. LXIII, p. 547.
71. Abel, J. J., and Crawford, A. C.: The Johns-Hopkins Bulletin, 1897, July, Vol. 8, p. 151, and Sept. and Oct., 1898, Vol. 9, p. 215.
72. Takamine, Jokichi: *Therapeutic Gazette*, 1901, whole series, Vol. XXV, p. 221.
73. Mayer, Emil: *Philadelphia Med. Journ.*, 1901, April 27th, Vol. VII, p. 819.
74. *New York Med. Journ.*, 1921, May 18th, Vol. 113, p. 755.
75. Trans. Amer. Laryng. Assoc., 1879, Vol. 1, p. 90.
76. The American Med. Assoc. Bulletin, May 15, 1921.
77. Casselberry, W. E.: Journ. Amer. Med. Assoc., 1898, Feb. 19th, Vol. 30, p. 401.

DEAF-MUTISM. AUTHOR'S ABSTRACT.

Dr. J. S. Fraser, Edinburgh, Scotland.

Classification: Cases of deaf-mutism are usually divided into (I) Congenital and (II) Acquired. This classification appears simple and convenient, but, as usually understood, is not scientifically accurate. Congenital deafness has usually been held to include not only "developmental" cases due to faults of the germ plasm, but also those due to such inflammatory conditions as intra-uterine meningitis. In other words, "congenital" has been regarded as synonymous with "before birth." Cases due to congenital syphilis are difficult to classify; they are undoubtedly of inflammatory origin, but do not, as a rule, become deaf till childhood is well advanced, or even later. On the other hand, cases in which there is a more or less gradual atrophy of Corti's organ and of the eighth nerve are certainly due to inherited weakness of the nerve structure, though the clinical condition may only manifest itself some time after birth. It therefore appears to be more scientific to divide cases of deafness into (I) those due to an error in development (constitutional, developmental or congenital deafmutism), and (II) those due to trauma or to inflammatory conditions (acquired or inflammatory deafmutism).

I. *Congenital or Developmental Deaf-Mutism.*

(A) *Endemic or Cretinic Deafness (Siebenmann's Type).*

Clinical Aspect. Patients may be mentally feeble and, in later life, demented, or they may be congenital idiots. A few are mentally bright. Most of the cases are complete cretins. Goitre may be present in the patient and other members of the family. The majority of the patients are deaf from birth, but some show only sound-conduction deafness. Nager, indeed, states that tuning-fork tests show that many cretinic deaf-mutes are really only "hard of hearing." This degree of deafness, however, in conjunction with the feeble mental development results in deaf-mutism. Siebenmann states that many endemic deaf-mutes can perceive tones over the whole eleven octaves. Stein finds that 25 per cent of cretins have normal hearing, 45 per cent slight deafness, 25 per cent severe deafness and 5 per cent absolute deafness. As a rule the disturbance of hearing is parallel with that of the bodily and intellectual development. Nager mentions the broad-based, waddling gait and attributes this to changes in the brain.

Pathology—Middle Ear. The changes here are important. Alexander mentions myxomatous thickening of the submucous tissues of the middle ear. In the great majority, if not in all cases, there was filling up of the window niches by connective tissue and fat cells. The long process of the incus and the head of the stapes may be adherent to the facial canal by connective tissue or bone. The footplate of the stapes may be ankylosed to the margin of the oval window. Exostoses are frequently found on the promontory, and there may be osteoporosis of the whole promontory wall (otosclerosis). The tympanum may be almost obliterated by new-formed, spongy bone. Inflammatory changes have been observed in the middle ear in several cases. These may have been accidental, but it is possible that the middle ear changes characteristic of cretinic deafness may be the results of otitis media. *The Labyrinth Capsule* is often thick and sclerotic. *Inner Ear.* Many observers have found the inner ear *normal.* Alexander, however, observed marked degenerative changes in Corti's organ, but only slight changes in the nerve and ganglia.

On the whole, then, we may say that in endemic or cretinic deafness there are marked changes in the middle ear and labyrinth capsule, including the window niches, whereas the inner ear in the majority of cases shows practically normal conditions. This is in marked contrast to the conditions found in sporadic congenital deafness, in which the membranous labyrinth and eighth nerve are at fault.

Views as to Pathology of Endemic Deaf-Mutism. Some observers believe that the changes are developmental and are caused by a congenital constitutional anomaly. Siebenmann believes that they occur between the fourth and sixth months of fetal life. Hardness of hearing is produced by changes in the middle ear, especially in the window niches, but complete deafness comes on when labyrinth atrophy occurs. Stein looks on the middle ear changes as post-embryonic and due to the failure of the normal resorption of the fetal connective tissues. He groups endemic deaf-mutism under the heading of "constitutional" deafness. Other investigators hold that the changes are in the brain and are due to intra-uterine meningitis. Denker believes that the deafness is caused by disturbance of the central nervous system resulting from disorders of metabolism owing to loss of thyroid secretion. Nager holds that in the later period of intra-uterine life the "goitre poison" influences the whole of fetal development, including the thyroid glands. This leads to disturbed ossification and dwarfism, as well as to the brain changes causing imbecility.

(B) Sporadic Congenital Deafness.

(1) *Aplasia of the Whole Labyrinth. (Michel's type.)* In Michel's case the external meatus and tympanic membranes were normal. The tympanic cavity was narrow, and both labyrinths and eighth nerves were absent. Siebenmann explains this condition by postulating absence of the otic vessicle in the first month of fetal life. Three other somewhat similar cases have been recorded. Siebenmann thinks that *congenital atresia of the external meatus* is not infrequently combined with malformation of the middle and inner ear, but Alexander states that, in most cases of this condition, functional examination shows a normal condition of the labyrinth.

(2) *Cases in which both the Bony and Membranous Labyrinths are affected. (Mondini's or Alexander's Type.)*

In most cases the patients were completely deaf, but two had slight remains of hearing. *Middle Ears.* Normal. *Bony Labyrinth.* In Mondini's case, the whole bony capsule of the cochlea was flattened from base to apex. A normal arrangement of the scala was only present at the lower part of the cochlea. In the upper part there was a wide common space. Alexander points out that a similar condition is seen at the second and third month of fetal life, and holds that in these cases normal development stops at this period. He points out that the embryonic membranous cochlea is at first covered in by a cartilaginous capsule which gradually assumes the external shape of the fully developed cochlea. A crest which divides off the various coils arises from the inner surface of this cartilaginous capsule and joins a membranous projection from the modiolus. The development of the cochlea takes place from base to apex, so that should development be arrested at a certain point, these septa may fail to form, with the result that the scala vestibuli of one coil will communicate with the scala tympani of the next higher coil.

The cochlear duct may be collapsed or dilated. Alexander found Corti's organ absent in many places; in others it showed an embryonic form, *i. e.*, it consisted of a row of epithelial cells arranged at right angles to the basilar membrane, and not differentiated into hair, pillar, and other supporting cells. *Cochlear Nerve.* In Alexander's case the ganglion did not take a spiral course, but was situated centrally in the modiolus. The condition of the cochlear nerve coincided with that in the lowest mammals—duckmole and echidna.

Vestibular apparatus. Alexander found atrophy of the macule of the utricle and saccule. In Mondini's case the aqueduct of the vestibule was dilated and formed a gutter only closed by mem-

brane posteriorly. The saccus endolymplaticus was very large and tensely filled.

(3) *Congenital Malformation affecting both the Cochlear and Vestibular Apparatus.* This clinical type of deaf-mutism is frequently associated with retinitis pigmentosa. The vestibular reactions are absent, or at least greatly diminished. Bezold has examined two deaf patients suffering from retinitis pigmentosa. Of the four ears, one was quite deaf, whereas the other three showed a hearing island. Frey and Harmerschlag have confirmed Bezold's findings in four cases. Of these, three at least were mentally feeble, while two had deaf-mute imbecile brothers or sisters. All four failed to react to rotation. Harmerschlag found that two out of three failed to react to the Galvanic test. Siebenmann and Bing's case was the fourth of eight children, of whom four were apparently born deaf. A brother of the patient also had retinitis pigmentosa.

Pathology: Vestibular apparatus. Siebenmann and Bing found the macule and criste degenerated, but the vestibular nerve and ganglion normal. There was marked atrophy of the vestibular nerve and ganglion in both of Oppikofer's cases. *Cochlear Apparatus.* Nager found the membranous cochlea dilated or collapsed and the sensory epithelium absent or badly developed. Many observers have found the spiral ganglion and the stem of the cochlear nerve markedly atrophied. The vascularity of the nerve endings in the cochlea and vestibule was poor. (This corresponds to the pathological changes in retinitis pigmentosa.) *Brain.* Bing noted sclerotic patches in the basilar artery and in the circle of Willis. The first two temporal convolutions, especially on the left side, were very small, and microscopic examination revealed senile endarteritis. The patient, however, was aged 79!

(4) *Sacculo-Cochlear Degeneration. (Scheibe's Type.)* Alexander estimates that about 70 per cent of cases of congenital deaf-mutism belong to the "sacculo-cochlear" type, in which the utricle and canal (pars superior) are intact. Hearing remnants are usually present in these cases. The vestibular apparatus reacts normally to rotation and caloric tests.

Pathology: As a rule no changes are found in the middle ear. The bony labyrinth is usually normal, but in Lindt's case there was on one side an otosclerotic focus. Gray has investigated four cases and found that the hollow spaces of the bony labyrinth were larger than normal. In most cases the sacculus is collapsed and the ductus reuniens obliterated. (In rare cases the sacculus is normal.)

The Cochlear Canal may be (1) collapsed in its entirety, or (2) dilated; (3) it may be dilated at one part and collapsed at another. The dilatation may be so great that the scala vestibuli is obliterated. If the canal is collapsed Reissner's membrane is usually adherent to the remains of Corti's organ or to the basilar membrane. Corti's organ may be absent in parts or unrecognizable. In less severe degrees of the affection it may be replaced by cubical or rounded cells, or almost normal in the upper coils. The membrana tectoria is usually covered with epithelium and tucked into the internal spiral sulcus, or backwards on to Hushke's tooth. In other cases the membrana tectoria is attached across the scala media to the stria vascularis. The stria itself may be absent or replaced by flat epithelium, or may form a polypoid projection into the scala media. The spiral ganglion and cochlear nerve usually show atrophy. (The writer records, with photomicrographs, a case of developmental deaf-mutism of the Scheibe type.)

Various theories have been advanced to account for the abnormalities observed. (a) *Faulty Development.* Oppikofer suggests that in some cases the otic vesicle may have been abnormally large. In others he suggests that the fold formation may have been due to adhesion of the walls of the cochlear canal, and cites as an analogy the formation of the membranous semicircular canals, which are originally hollow out-growths from the otic vesicle. The central portions of these out-growths become adherent and are absorbed, while only the peripheral part remains to form the canals. If the developmental disturbance occurs in the first two months of fetal life the membrana tectoria is not formed at all or is rudimentary. If the disturbance occurs later, the membrana tectoria and the ganglion and nerves may be well developed, though Corti's organ is rudimentary. According to Alexander, in about one-third of the cases circumscribed areas of Corti's organ and the nerve ganglia are functionally efficient, so that there are some remains of hearing. (b) *Hereditary Weakness of the Ear.* The changes found in congenital deafness are similar to those seen in chronic progressive labyrinthine deafness. The atrophic degenerative process may occur in intra-uterine life, or may at least begin then and continue after birth. Politzer has described progressive labyrinthine deafness coming on in youth and resulting in marked diminution of hearing or even complete deafness. Spira has called attention to the occurrence of ear affections in certain families. Gowers has described the condition of "abiotrophy," in which there is a want of nervous energy to bear the strain of normal or excessive functional activity. Such conditions as progressive muscular atrophy, primary optic

atrophy, and progressive nerve deafness belong to this category. Goerke wishes to add otosclerosis to the list.

(3) *Increased Pressure in Perilymphatic or Endolymphatic Spaces.* Gray holds that the increase in the size of the hollow spaces of the bony labyrinth may be due to increased intracranial and perilymphatic pressure during the fetal or early post-fetal life. Dilatation of the cochlear canal, on the other hand, may be due to increased secretion of endolymph from the enlarged stria vascularis, which is a secretory organ. Pritchard considers that the hypertrophied condition of the stria in these cases resembles very closely the tegmentum vasculosum in the cochlea of birds.

(4) *Inflammatory Changes.* Siebenmann, Nager and Oppikofer believe that the conditions present are due to an intra-uterine meningitis. Siebenmann mentions the possibility of placental infection as the cause of meningitis in the fetus. For example, Gradwohl has recorded the case of a woman, aged 31, seven months pregnant, who suffered from pain in the left ear rapidly followed by coma. Well-marked signs of meningitis were present. The patient died undelivered. Autopsy revealed purulent basal meningitis. The fetus also showed sero-purulent meningitis. The cerebro-spinal fluid of both mother and fetus showed the diplococcus intra-cellularis, and the same organism was separated in pure culture from the left ear of the mother. Herzog has produced labyrinthitis experimentally and claims to have found changes in the membranous labyrinth similar to those seen in congenital deaf-mutes. The present writer, however, does not believe that sporadic congenital deaf-mutism is due to intra-uterine meningitis, firstly, because the membranous labyrinth is developed from the epiblast and only later becomes connected to the central nervous system by means of the acoustic ganglia and eighth nerve; secondly, because it is difficult or impossible to think of fetal meningitis affecting only the saccule and cochlea and leaving intact the remaining parts of the membranous labyrinth; and, thirdly, because the changes observed in congenital deafness differ so markedly from those produced in the inner ear in cases of meningitic labyrinthitis in post-fetal life.

Congenital Deafness and Otosclerosis.

In at least seven cases of congenital deafness a focus of otosclerosis has been found in the labyrinth capsule. Alexander believes that this shows that there is a stepping-stone between congenital deafness and the various forms of congenital hardness of hearing. While the first rudiments of otosclerosis are often of con-

genital origin, ankylosis of the stapes and atrophy of the sensory epithelium are secondary. Congenital otosclerotic foci may exist without giving rise to symptoms until the age of puberty. Koerner believes that otosclerosis is due to certain determinants in the germinal cells of the parents, but is influenced by puberty, parturition, the climacteric period, and also by diseases of the middle ear. He explains cases of otosclerosis with no apparent heredity by supposing that the disease has skipped some generations. Manasse has shown that the nerve changes are the same in advanced otosclerosis and in pure nerve deafness. Further, we know that there are cases of atypical otosclerosis in which functional examination apparently shows pure nerve deafness. Goerke apparently believes that the focus of pathological bone in otosclerosis is only incidental and not of great importance. Stein is of opinion that in otosclerosis there are always other diseases of degenerative origin, while Hammerschlag reminds us that there are families in which cases both of hereditary deafness and otosclerosis are to be found. These facts suggest that hereditary deafness and otosclerosis are to be regarded as different forms of one and the same pathological process.

Deaf-Mutism associated with Changes in the Brain.

Castex has stated that in his experience deaf-mutism is usually due to changes in the cortical hearing area and much less often to changes in the ear. He believes that the cortical changes are due to meningitis which is sometimes intra-uterine. Brock comes to the conclusion that we must give up the view that in all cases of deaf-mutism the explanation is to be found in malformation or disease of the ear, though he admits that the deafness may be explained by alterations in the sensory hair cells too fine to be recognized by the microscope. The question of deafness due to brain lesions is a very difficult one. Microscopic examination of the hearing tracts and centres requires great experience for the proper interpretation of the appearances presented by the different layers of the cortical hearing centre. The otologist, who examines the labyrinth, should work in conjunction with a neuro-histologist.

II. *Acquired or Inflammatory Deaf-Mutism.*

The pathology of acquired or inflammatory deaf-mutism is a comparatively simple problem. It is the *pathology of labyrinthitis occurring in intra-uterine or post-fetal life.* Intra-uterine labyrinthitis is almost certainly of meningitic origin. Post-fetal labyrinthitis, on the other hand, may be due to (1) traumatism, as in fracture of the cranial base; (2) to otitis media with invasion of the labyrinth through the oval or round windows or through the prominence of

the lateral semicircular canal; or, (3) to purulent leptomeningitis with infection of the inner ear either along the fibres of the eighth nerve or along the aqueduct of the cochlea. It may, however, be difficult or impossible to determine by microscopic examination—many years after the occurrence of deafness—the exact route of infection of the labyrinth. (The writer records with photomicrographs a case of inflammatory or acquired deaf-mutism, *i. e.*, spontaneous cure of labyrinthitis which may have resulted from purulent otitis media or, more probably, from meningitis possibly of intra-uterine origin.)

1. *Deaf-mutism due to Trauma* follows fracture of the cranial base, which involves the labyrinth on both sides. About four per cent of cases of acquired deaf-mutism are of traumatic origin. Microscopic examination may show traces of old fracture of the petrous bone. The semi-circular canals are almost filled up with new bone; the perilymphatic space of the vestibule greatly reduced by new bone and connective tissue. The utricle and saccule are dilated. The cochlea shows (a) new formed bone and connective tissue in the perilymphatic space; (b) great dilatation of the cochlear duct; (c) atrophic degeneration of the neuropithelium and spiral ganglion.

2. *Deaf-mutism due to Labyrinthitis following Middle-Ear Suppuration.* Middle-ear lesions alone do not as a rule produce such severe deafness as to give rise to deaf-mutism, but closure of both labyrinth windows may produce deaf-mutism even when the inner ear is intact. (a) In deaf-mutism due to *scarlatinal otitus media and interna,* there is great destruction of the middle ear. The drumhead and ossicles are usually absent, while cholesteatoma is present with caries and necrosis of the bony walls of the middle ear. The labyrinth may show chronic suppurative labyrinthitis, new connective tissue and bone formation, or the hollow spaces may be filled with cholesteatoma, which has passed in through the open oval window. Much the same changes are present in cases of *deaf-mutism due to measles.* (b) Siebenmann states that tuberculous middle-ear disease may destroy the bone extensively and yet may finally heal up, with resulting deaf-mutism. (c) In regard to *"Congenital" Syphilitic Deafness,* there are two views as to the nature of the pathological changes. Some observers hold that the deafness is due to syphilitic meningitis and secondary neuro-labyrinthitis, while others believe that it is secondary to otitis media which, in syphilitic children, does not clear up, but breaks through the windows or invades the bony capsule of the labyrinth and so reaches the hollow spaces of the inner ear. In support of the latter

view cases have been reported by Moos and Steinbrugge, Gradenigo and the writer.

3. *Deaf-mutism due to Labyrinthitis following Purulent Meningitis.* The meningitis may occur either during intra-uterine or post-fetal life. Post-fetal meningitis may be due to epidemic cerebro-spinal meningitis, measles, pneumonia, scarlet fever, influenza, etc. The inflammatory process begins in the perilymphatic space with hyperemia, stasis, thrombosis, and rupture of the smaller vessels. This is followed by infiltration and necrosis of the endosteum. The blood supply from the endosteum is cut off, and this leads to necrosis of the sensory epithelium with curdling of the endolymph. The eighth nerve is embedded in pus. Later on the labyrinthine fluid becomes purulent, with complete destruction of the membranous labyrinth. This stage results in the formation of granulation and connective tissue. Lastly, there is new bone formation. The round window membrane is thickened and ossified, while the footplate of the stapes may be displaced towards the tympanic cavity. At least six cases of deaf-mutism apparently due to labyrinthitis caused by intra-uterine meningitis are on record. For obvious reasons it is impossible to prove this with certainty.

Post-fetal meningitis is the most frequent cause of *acquired* deaf-mutism. (a) The majority of cases are due to epidemic meningitis. An almost abortive form of meningitis may lead to severe changes in the inner ear and consequent deafness. In deaf-mutism of meningitic origin there are marked changes in the labyrinth and relatively slight changes in the middle ear, whereas in deaf-mutism of tympanic origin there are gross changes in the middle ear and less marked changes in the labyrinth. In meningitic cases the most marked changes are found in the cochlea and canals. In most cases there is ankylosis of the stapes and bony closure of the round window. Investigation of the central nervous system has shown chronic internal hydrocephalus in some instances. (b) *Measles.* Reimer observed meningitis in fifteen out of fifty-one autopsies on cases of measles. Nager has recorded the case of a boy who became deaf at 3 years. He was slow in regaining the power of walking, probably owing to changes in the macule of the saccule and utricle. Examination showed dilatation of the membranous labyrinth, destruction of Corti's organ, atrophy of the spiral ganglion and nerve fibres. (c) *Scarlet Fever.* In most cases of post-scarlatinal deaf-mutism the drumheads are normal, while some of the patients show weakness of intellect, just as after other forms of meningitis. (d) *"Congenital" Syphilis.* Otto Mayer has exam-

ined the ears of eleven syphilitic infants who died at periods varying form ten minutes to seventeen months after birth and found evidence of inflammatory changes in the pia arachnoid in ten. Lymphocytic infiltration was present along the trunk of the eighth nerve, especially marked at the fundus of the internal meatus. The meningitis could be traced to the spiral ganglion in the basal coil. Corti's organ showed similar changes. There was also meningitic infiltration along the aqueduct of the cochlea. Mayer believes that "congenital" syphilitic deafness is probably due to an extension of syphilitic meningitis along the acoustic nerve. (e) *Meningitic Labyrinthitis due to Osteomyelitis and Mumps.* The appearances described by Steinbrugge in a case of deaf-mutism due to osteomyelitis correspond to those observed in healed cases of meningitic neuro-labyrinthitis. Siebenmann states that the pathology of deafness after mumps is of a similar nature, but others hold that it is due to infective embolism.

Clinical Examination of Deaf-Mutes.

The classification of a given case of deaf-mutism as either "congenital" or "acquired" might appear to be a comparatively easy matter. No doubt if we could always obtain an accurate history of the case from the child's parents or doctor, the question of correct classification would be greatly simplified. Further, if we always obtained typical functional results for each given group of cases, *e. g.*, if a "developmental" case invariably had some remains of hearing and normal vestibular reactions, or if an "inflammatory" case always occurred after speech had been acquired and resulted in complete deafness and absence of response to rotation and caloric tests, it would be a simple matter to divide a number of deaf-mutes into their proper categories. The fact is, however, that we have to depend very largely on the statements of the child's parents—statements which are frequently quite unreliable—and on the hearing and vestibular tests, which are often ambiguous or difficult to carry out. Otoscopic examination is by no means a reliable guide. The fact that a child is suffering from chronic middle-ear suppuration does not prove that the deaf-mutism has been caused by labyrinthitis of tympanic origin. A child born with a congenital abnormality of the cochlea and saccule may suffer from middle-ear suppuration The first case recorded by the writer was a "congenital" deaf-mute who died as a result of an intracranial complication of middle-ear suppuration. On the other hand, the fetus may suffer from meningitis in utero, or the infant may have a meningitis labyrinthitis before speech has begun to develop. Such cases would probably be

regarded by the parents as instances of congenital deaf-mutism, whereas in reality the hearing defect was acquired. The second of the writer's cases was looked upon by the boy's mother as one of congenital deafness, but microscopic examination showed that the cause of the deaf-mutism was bilateral labyrinthitis of tympanic or meningitic origin.

Sex. Nager points out that in congenital deaf-mutism the sexes are nearly equal, but in acquired cases the boys greatly outnumber the girls. He suggests that boys may suffer more from fevers than girls.

Blood Relationship of Parents. Hammerschlag finds that in cases in which there was only one deaf-mute in a family the marriage was consanguineous in 14 per cent; in cases with two deaf-mutes, 22 per cent; with three or more, 55 per cent. Apparently about 12 per cent of deaf-mutes have parents who were related before marriage.

Heredity. Nager points out that direct heredity is rare and that only one out of a hundred deaf-mutes had deaf-mute parents. On the other hand, if both parents are deaf-mutes from birth, 26 per cent of their children are deaf-mutes.

Proportions of Congenital and Acquired Deaf-Mutism. If we gather together the statistics compiled by various observers, we obtain a percentage of 58 congenital cases, 43 acquired and 5 doubtful. The percentage of cases in each group depends upon the region investigated. In Switzerland, for example, there are many more congenital than acquired cases, on account of the presence of endemic cretinism.

Causes of Acquired Deaf-Mutism. If we again assemble the figures given by the various writers, it appears that of each hundred cases of acquired deaf-mutism, 36 were due to epidemic meningitis, 16 to scarlet fever, 10 to measles, 10 to pneumonia, 11 to syphilis, 4 to trauma, 3 each to whooping-cough, mumps, and typhoid fever, and 2 each to influenza and pneumonia.

Congenital syphilis. According to the findings of different investigators the percentage of cases of deaf-mutism attributed to congenital syphilis varies from 2.5 to 18.6. The higher figures are obtained by the Wassermann reaction. According to Kerr, Love and Browning, even this reaction does not discover all cases of congenital syphilis, *i. e.*, a negative reaction cannot be taken as complete proof that syphilis is not the cause of deafness.

Functional Examination of Deaf-Mutes.

(A) *Cochlear Apparatus.* Itard's clinical classification of deaf-mutism is as follows: Group I. Conversation voice heard at 6 feet. II. Raised voice heard close to ear. III. Vowel hearing. IV. Loud noises heard, *e. g.,* rattle, trumpet, whistle, or hand-clapping. V. Total deafness. Class V can be excluded as early as six months, provided that the infants are otherwise mentally normal. Group III can only be satisfactorily examined at the age of two years and Groups I and II at the age of four to five years. Alexander calls attention to the fact that the totally deaf drag their feet because they cannot hear the unpleasant sound thus produced. From the foregoing figures given by various observers it appears that from 25 to 40 per cent of deaf-mute cases are totally deaf. Schmeigelow remarks that the percentage varies according to the method employed in testing the children. From 25 to 30 per cent of deaf-mutes have hearing remains sufficient to be of some use for education.

(B) *Vestibular Apparatus.* Alexander states that in cases of deaf-mutism in which the history is doubtful, we can assume that the case is congenital if the static labyrinth is excitable. Frey and Hammerschlag employed the rotation test and found that in acquired cases 15 per cent showed a positive vestibular reaction, 81 per cent were negative, and 4 per cent doubtful. In congenital cases, on the other hand, 71 per cent were positive, 24 per cent negative, and 5 per cent doubtful. Pollak has examined the galvanic reaction and found that in congenital cases 86 per cent had normal and 14 per cent had absent reaction. In acquired deaf-mutism, 71 per cent had absent and 29 per cent had normal galvanic reaction.

The writer has examined 140 children in a deaf-mute institution. The paper contains a detailed account of this investigation.

AEROCELE OF THE BRAIN WITH REPORT OF CASES.*

DR. ARCHIBALD D. MCCANNEL, Minot, North Dakota.

Aerocele of the brain, or air within the cranial cavity, is rather an uncommon condition. I find that this lesion has been recognized only comparatively recently, and the cases in literature are not very numerous, and they seem to be confined to American and French literature. I shall give a brief review of the summary of nine cases Dr. Spiller found reported in the literature, together with a summary of his own case.

My attention was called to this when Prof. William G. Spiller, of the University of Pennsylvania, reported a case of aerocele of the brain, and his report, including Roentgenograms, so nearly corresponded with mine that my interest was aroused.

The lesions are usually found in the cerebrum, developing after a fracture of the skull, usually in the frontal region; but cases have been reported in the temperosphenoidal lobe, communicating with the mastoid cells, following a fracture of the base.

Of the cases I have found reported, the fracture has communicated with the brain substance through breaks in the dura. The presence of air within the cranial cavity may be accounted for in different ways, according to its location:—

(1) Following fracture of the skull, through pneumatic sinus, the air forming a pocket between the dura and the cranium.

(2) In cases of fracture where the dura is ruptured, softening or hemorrhage occurs in the frontal lobe, and with the absorption of this degenerated tissue the space for the collection of air in the cranium is afforded; then, the forcing of air into the cranial cavity completes the picture.

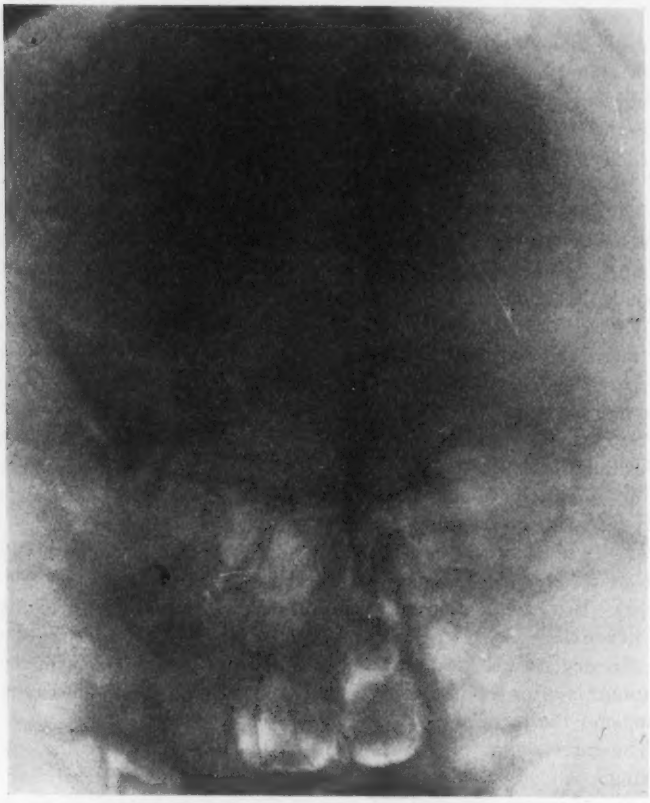
The cases so far reported, according to Dr. Spiller, are the following:

(e) "Luckett regarded his case as the first on record of air in the ventricles of the brain diagnosed as such before operation, found to be so at operation, and, lastly, proved to be correct at necropsy."

(j) "W. H. Stewart's case is reported as one of air in the ventricles. As a result of trauma the vertical plate of frontal bone was fractured in the region of the outer edge of the right frontal sinus. Symptoms steadily improved, and patient demanded release from hospital. In two weeks and four days later he was readmitted to the hospital with a severe headache and occasional vomiting; he was

*North Dakota State Medical Meeting, Jamestown, North Dakota, June 1 and 2, 1922.

dull and listless. He was supposed to have abscess of the brain, and he had bilateral optic neuritis. The following day Roentgen-ray examination showed that the ventricles were distended with air or gas. This had not been observed previously."



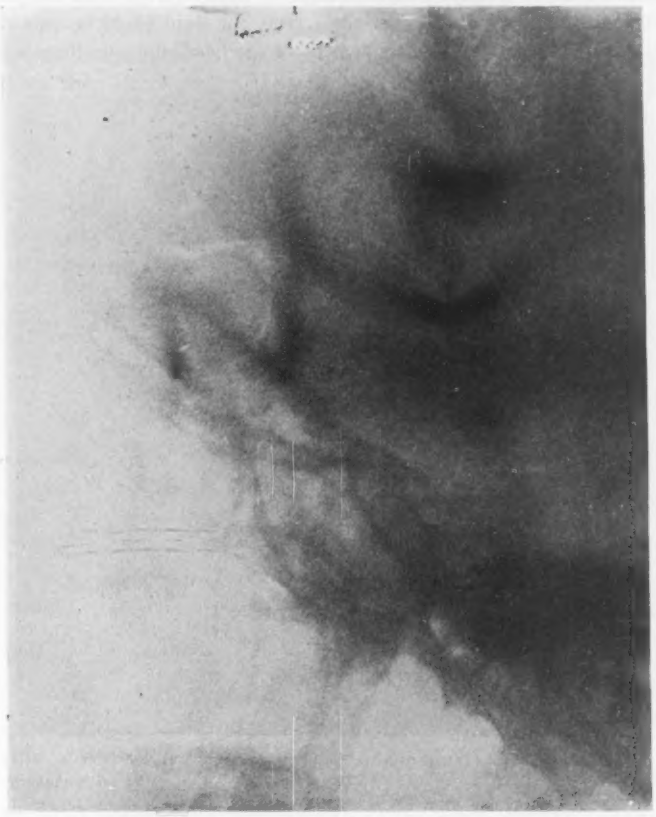
1. Roentgenogram (antero-posterior), taken 6/25/21, 8 days after accident.

(a) "G. Cotte reported a hydropneumatocele of the head in the frontal region, following a fracture of the skull. It was supposed to come from the frontal sinus."

(i) "E. H. Skinner's patient had a fracture of the right superorbital ridge of the skull."

(c) "In Holmes' case the Roentgen-ray examination, made almost immediately after the accident, showed a linear fracture through the outer table of the frontal bone, with a suggestion of a continua-

tion of the fracture through the inner table. The frontal sinus was involved. A large oval area of markedly diminished density in frontal region indicated an early collection of air within the cranium. One week later the patient developed meningeal symptoms. At operation the dura beneath the posterior wall was incised, and two

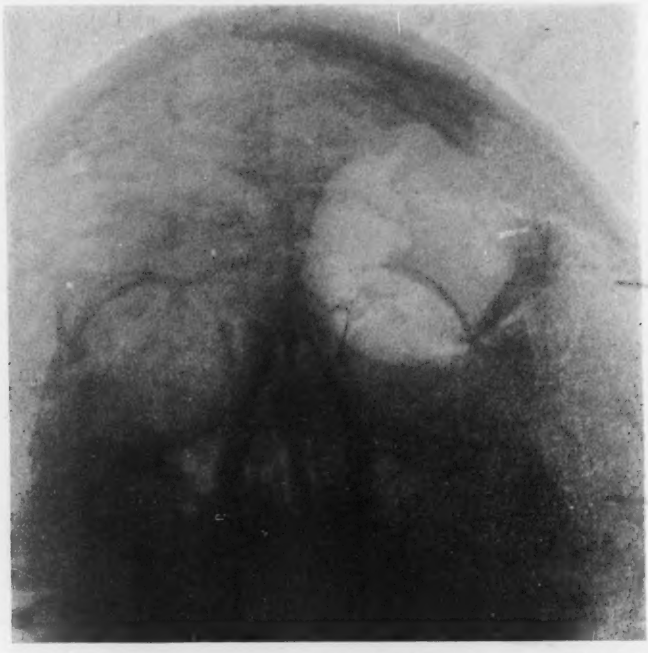


2. Roentgenogram (lateral posterior), taken 6/25/21, 8 days after accident.

ounces of turbid serum and air escaped. The patient died two days later from meningitis."

(g) "Hollis E. Potter reports a case of hydropneumocranium with air in the ventricles. A man, after a fall of fifteen feet, probably had a fracture of the skull, but no loss of consciousness and no pronounced nervous symptoms, except headache, which lasted

only a week. Routine Roentgen-ray examination disclosed a frontal skull fracture; there was evidence of gaseous accumulation in volume and shape comparable to a hen's egg. This finding was not made until three weeks after the injury. After two weeks there was considerable increase in volume of gas, and the cavity was found, then, to contain fluid, the level of which varied with the position of the head, and, under the screen, the fluid could be seen to splash. With any sudden movement of the head, the splashing was



3. Roentgenogram (antero-posterior), taken 7/12/21, 3 weeks after accident. (Note presence of aerocele.)

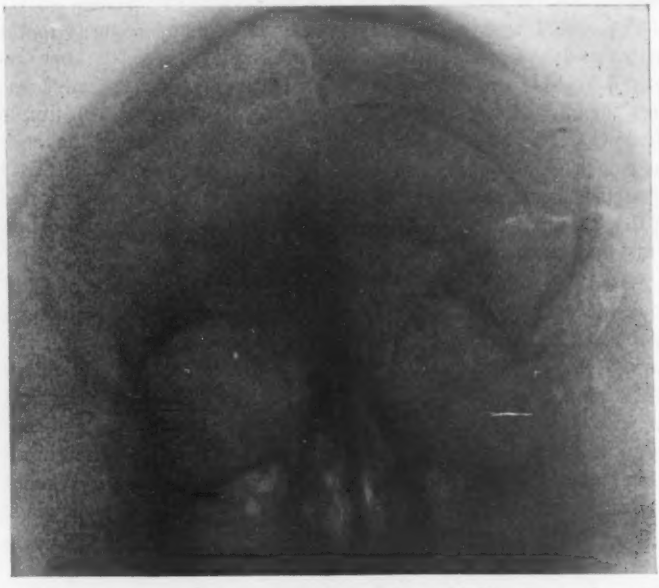
audible. The air and fluid disappeared, and two months from the time of the accident no evidence of the cavity could be found."

(f) "R. J. May's case is very briefly reported as one showing air within the cranial cavity. The patient was knocked down and died within a few hours. Roentgenograms were made the next day, several hours after death. A fracture was found in the right frontal bone, and a large air space was found in the frontal region."

(b) "Glenard and Aimard report a case of a soldier shot in the head, the bullet entering the frontal region. Cerebro-spinal fluid

escaped in small quantities for two months. A Roentgenogram taken two months after the injury showed a clear space in the left frontal lobe. Later the space filled with liquid, as a bruit could be heard on sudden movements of the head. Later, both air and fluid disappeared. The man had had no headaches nor other cerebral symptoms, and operation was not thought advisable."

(d) "H. M. Imboden's case was one of fracture of the skull, in which several pieces of bone were removed, and aerocele was found some time afterwards directly beneath the site of the fracture. No



4. Roentgenogram (antero-posterior), taken 10/1/21, 4 months after accident.

operation was done, and a Roentgen examination one month later showed air had been completely replaced by brain tissue."

(h) "The last case reported was one by Drs. Spiller and Doyle. The patient, aged 50, met with an automobile accident nearly three months previous to his admission to the hospital, having had a fracture of the skull in the left frontal region. He was unconscious after the accident for some days, and since, had complained of headache in the frontal region. He had been blind in the left eye since the accident. Two weeks before admission he began to have frequent fainting spells, four or five daily. He became irrational a

week later, and had marked defect in memory, and was not ataxic. The left eye-ball became sunken and displaced somewhat downwards. Roentgenograms showed a fracture running into the frontal sinus from the left temporal region, and a collection of air in the left temporal region was diagnosed. Some three weeks after the accident he began to show signs of increased intra-cranial pressure. One week later he had numerous convulsions, and he was operated on to let the air escape. The dura was tense, and air rushed out with an audible hissing sound. The pulse and respiration went up rapidly, and the patient died the following day."

The case I wish to report corresponds in many respects to the ten cases I have found in the literature, especially to the one reported by Skinner. This was the first case I had seen, and I was very much surprised, upon making Roentgenograms, to find a shadow of diminished density, some four weeks after the accident, which was not present when I first saw the patient eight days after the accident. This case differs from all the others reported in that the eye symptoms were more marked and the general symptoms were practically absent.

Mrs. W. S. was referred to me by Drs. Hoyt and Smith of Glasgow, Montana, on account of partial loss of vision in right eye, double vision, and the right eye turning in.. The patient gave the following history: Eight days before she met with an automobile accident, the machine going over a culvert, and she was thrown against the windshield. She was taken to Glasgow Hospital in a semi-conscious condition, with a wound over the outer side of the supra-orbital ridge. This wound was taken care of at the time. When I first saw her (eight days after the accident) I found the following:

Wound healed . . . 5 cm. long, extending from forehead down and out, across the external angle of the orbit . . . slight exophthalmous of right eye . . . conjunctiva congested . . . cornea clear . . . iris normal . . . pupil slightly enlarged . . . good consunsual reaction, but rather sluggish to direct light . . . complete paralysis of external rectus muscle of right eye. Fundus examination showed media clear, but marked congestion of disc and retina. Vision, right eye: fingers at 12″; left eye, 20/20.

Roentgen-ray examination showed fracture of frontal bone, extending from center of frontal sinus to the temporal region. Both frontal sinuses were normal. The patient did not complain of headaches nor other pressure symptoms. I kept the patient quiet, warning her not to blow her nose forcibly. I gave her potassium iodide, internally.

One week later vision was: Right, 10/200; left, 20/20, and slight improvement of external rectus.

In another week, vision had improved to 20/100. After another week (which was three weeks after the accident) I decided to let the patient go home.

Before doing so, I made another Roentgen-ray examination, and, to my surprise, found a large round area of diminished density directly beneath the site of the fracture into the frontal sinus. I had Dr. Pence confirm my Roentgenograms, and we decided it was an air pocket. As the patient was improving steadily, she returned home one week later, or five weeks after the accident, with vision in right eye 20/50, and left eye, 20/20, and the external rectus muscle almost completely recovered. The Roentgenograms showed an area of diminished density of the same size as the week before.

Two months later the patient returned, and Roentgen-ray examination showed no area of diminished density. Complete recovery of external rectus muscle; no double vision. Fundus examination showed optic nerve rather white. Vision, right eye, 20/50; left eye, 20/20.

In conclusion we may summarize as follows:

1. Aerocele of the brain, or air in the cranial cavity, is a comparatively rare condition; but, I believe that when attention is called to this condition that more cases will be reported.

2. Aerocele does not always appear at the time of the trauma or accident, but, usually, two or three weeks later; and, in all cases of head injury, especially in fractures near the sinuses, this condition should be looked for.

3. The Roentgenogram is the only means of making a diagnosis.

4. The pathology of this condition has not been definitely settled.

BIBLIOGRAPHY.

a COTTE, G.: Bull. et mem., Soc. de chir. de par., 1917, n. s., XLIII, 865-867.
b GLENARD, R., AND AIMARD, J.: Presse med., Par., 1919, XXVII, 375.
c HOLMES, G. W.: Am. J. Roentgenology, N. Y., 1918, n. s. v. 384-386.
d IMBODEN: Amer. Atlas of Stereoroentgenology, XI.
e LUCKETT, W. H.: Surg. Gynec. and Obst., Chicago, 1919, XVII, 237-240.
f MAY, R. J.: Am. J. Roentgenology, N. Y., 1919, n. s., VI, 180.
g POTTER, HOLLIS E.: Am. J. Roentgenology, N. Y., 1919, n. s. VI, 12-16.
h SHIELDS, SPILLER AND MARTIN: U. of Pa. Medical Bulletin, 1909, p. 298.
DOYLE, A. S., per SPILLER: Am. J. Roentgenology, 1921, VIII, No. 2, 73.
i SKINNER, E. H.: J. Am. Med. Assn., Chicago, 1916, LXVI, 954.
j STEWART, W. H.: Am. J. Roentgenology, Detroit, 1913-1914, n. s., I, II, 83-87, 2 pl.

THE VALUE AND ULTIMATE FATE OF BONE AND CARTILAGE TRANSPLANTS IN THE CORRECTION OF NASAL DEFORMITIES.*

Dr. William Wesley Carter, New York City.

Nasal deformities of whatever description are due to or are accompanied by abnormalities or irregularities in the shape, size or position of the bony and cartilaginous framework of the organ. The function may be disturbed, or the skin of the nose may be involved in various ways, but these are accompaniments to the much more important basic fault which lies in the framework. Upon our ability to reconstruct this, or to adjust its component parts so that it will support the soft tissues and preserve the cotour of a normal nose depends the success or failure of our efforts to effect a permanent correction. I say permanent advisedly, because we all know that sometimes a mis-shapen nose may be forcibly mobilized and moulded into perfect shape by means of splints, but if the correction does not involve the proper adjustment of the framework, the original deformity recurs with remarkable celerity after the supports are removed.

My experience has been confined to the transplantation of autogenous bone and cartilage in the human subject, and I have not observed to any extent the microscopical changes that occur in these tissues after their implantation. But I have kept some of my patients under observation for many years, and by making physical and X-ray examinations at intervals, have found out what final clinical results may be expected, and I know from a practical point of view what happens to autogenous bone and cartilage when it is transplanted into the nose.

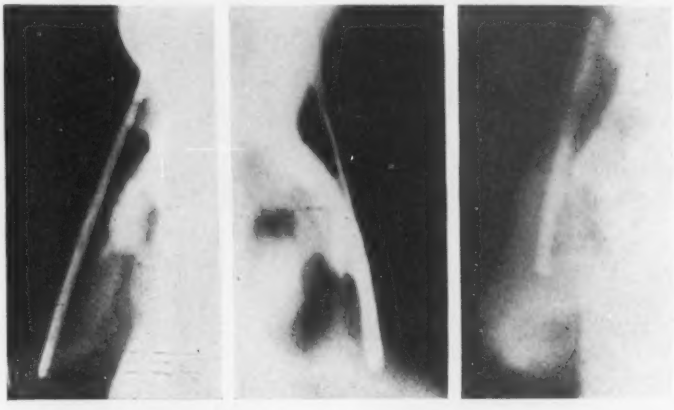
The application of my methods and the radiographic history of bone and cartilage transplants will be demonstrated in connection with figures thrown upon the screen.

From a practical, mechanical and architectural point of view the nose is an arch composed of an indefinite number of bone and cartilage segments so placed that it will retain its shape and position when supported only at its extremities. The upper edge of the septum, where it is wedged in between the lateral

*Read before the Section on Rhinology and Laryngology, N. Y. Academy of Medicine, Nov. 23, 1921.

cartilages, constitutes the keystone of the arch. The displacement of this or any of the other segments causes more or less collapse of the structure, resulting in a flattening of the curve and a re-establishment of the arch on a lower level. The septum as a vertical support strengthens the arch, but is not necessary for the preservation of its integrity.

The most frequent use for bone and cartilage transplants in rhinological surgery is found in those cases where a deficiency in the framework of the nose has resulted in a depressed deformity which may involve the tip, as well as the dorsum, of the nose. The most common causes of this deformity are:



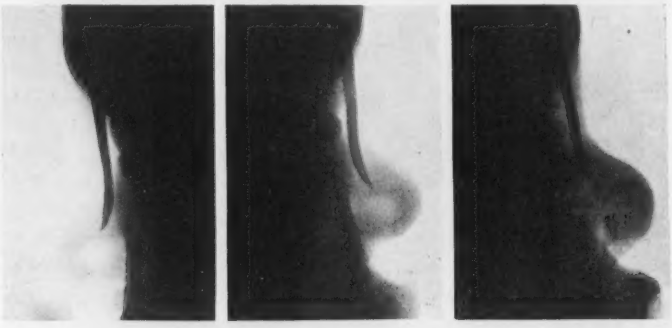
1 2 3

Fig. 1. Correct position for transplant (2 months after operation).
Fig. 2. Two years and 4 months after operation. Note increased growth of bone at periosteum contacts.
Fig. 3. Case in which infection occurred but was controlled. Shows spot of absorption, 7 months after operation. Deformity in this case did not recur.

1 Congenital defects. 2 The submucous operation (due either to faulty technique or infection following the operation). 3 Abcess of the septum. 4 Atrophic rhinitis. 5 Syphilis, tuberculosis, lupus, etc.

We must remember that the function of the transplant is not primarily that of a mechanical filler to replace tissues that have been destroyed; this is a secondary, though often important, consideration from a cosmetic point of view. Our chief concern is to restore the function and symmetry of the nose to their natural state by constructing a framework of normal tissues that shall be capable of supporting the soft structures of the

nose in their proper position, and to do this if possible without leaving a noticeable scar. In order that this correction, primarily secured, may be permanent and able to withstand the powerful influence of cicatricial contraction and elasticity of the skin which tend to reproduce the original deformity and which must always be reckoned with, the foundations for the new framework must be carefully selected and the transplants accurately placed upon them. The bone-graft must be of the same chemical constitution as the tissues of the host, it must be alive, capable of growth and must establish nutritive connections with the surrounding tissues and bony union with the adjacent bones in its new position. The best results are se-



4 5 6

Fig. 4. Bone transplant two years after operation (congenital deformity). (Old case.)
Fig. 5. Bone transplant four years after operation (congenital deformity). Same as Fig. 4.
Fig. 6. Six years after operation. Same as Figs. 4 and 5.

cured by using autogenous, periosteum-covered transplants and placing them in contact with live bone, the periosteum of which is elevated at the point of contact with the transplant.

Bare bone is useful for its mechanical and osteo-conductive properties, it does not, however, possess the inherent vitality of the periosteum-covered transplant.

It is not my purpose to discuss here the various views held by different writers in regard to the growth of bone and the influence of the periosteum on the regeneration of bone. My clinical cases appear to show that bone is formed by the so-called periosseous osteo-genetic layer of the periosteum, the cells of this layer being protected and their growth limited by the connective tissue layer of the latter; this envelope is anal-

ogous to the limiting fibrous capsule which separates all highly specialized tissue, such as the liver, kidneys, etc., from surrounding structures.

In none of my cases has there been an overgrowth of bone, the growth of the tissue here as elsewhere in the body being regulated by the functional demands and by the hereditary lim-

7

8

9

10

Figs. 7, 8, 9, 10. Traumatism in infancy resulting in deformity. Corrected by bone transplantation.

its of growth for this locality. On the other hand, if the transplanted tissue lies passive and performs no function, it is absorbed, even though it had been received kindly by the host and had originally established vascular connections. This is in accordance with the physiological law that functionless tis-

sues meet with no tolerance in the human economy. Under such circumstances I have observed the absorption of both bare bone and periosteum-covered bone; in one instance four years elapsed before the process of absorption was complete. Absorption, however, following the death of a transplant from infection or other sudden shock, such as over-heating and contact with chemical disinfectants, is very rapid. I have noted the almost complete disappearance of a transplant six weeks after operation in a case where the tissue had been killed by improper handling before it was introduced. This seems to show that absorption following disuse is a slow process and goes on pari passu with a gradual, progressive, molecular death of the transplant, whereas in the latter instance where death of the entire graft has suddenly occurred, all of the absorptive agencies are immediately brought into action to rid the body of a foreign substance, the presence of which is inimical to the healthy activity of the adjacent cells. The only insurance against the absorption of a bone transplant is the early establishment of nutritive connections with the adjacent capillary circulation. For this reason chiefly I have always advocated the use of the rib, which probably has more nutrient foramina to the square inch than any other accessible bone in the body; therefore, it is more easily penetrated by the capillaries which quickly establish connections with the Haversian system. The re-establishment of a permanent circulation in the transplant is the most important consideration in this work, for upon it depends the life of the graft. The center of a transplant is least accessible to the peripheral blood supply, therefore the cells in this location suffer. In the X-ray plates of all of my cases there appears, shortly after the operation, a thin line of absorption, very like a small medullary canal, in the center of the transplant. This line of absorption seems in time to grow smaller and its edges more sharply defined.

The vitality of a transplant varies in inverse proportion to its bulk; a comparatively thin segment, one side of which is periosteum-covered, when properly implanted, preserves the greatest possible proportion of its inherent vitality. Where it is necessary to build up the bridge to any extent, it is far better to introduce several thin pieces of bone than one of considerable bulk.

The technique of my operation has been previously described and I assume that you are familiar with it. Suffice it here to

say that in selecting the size, shape and quality of the transplant, I am guided by the physiological demands of the particular case. Bone and cartilage are used to replace their respective tissues where these are deficient. The implanted tissue usually consists of two-thirds bone and one-third cartilage, and is removed from the eighth or ninth rib, at the costo-chondral junction.

The main or dorsal segment is introduced through a small incision in the roof of the left nasal vestibule, and its upper end is placed in intimate contact with the frontal bone. On account of the great strain falling upon this support owing to the elasticity of the skin and the subsequent cicatricial contraction, I have for the past few years been using in many of my cases a supporting strut of cartilage which is introduced between the columellae, the upper end of this strut rests under the lower end of the dorsal transplant and the lower end is in contact with the nasal spine of the superior maxilla.

The temptation to use cartilage exclusively for transplantation is great, for it is more easily shaped to suit the deformity. The chief objection to its use is that it does not establish bony union with the frontal bone, but always remains movable. Its growth is not as vigorous as that of bone. Used, however, as I have indicated, it fulfills every expectation. I have found cartilage indispensable for filling in minor defects, and I have secured excellent results in cases of collapsed alae by grafting thin strips of cartilage into the wings. The efficiency of this operation has been greatly augmented since I began using my gold-wire splints instead of packing after intra-nasal operations. Apparently cartilage is just as sensitive to infection as bone; in the only two of my cartilage cases that became infected, the transplants had to be removed; there was distinct gross evidence of superficial destruction of tissue on both grafts.

Our main object is to secure permanent results, and these are dependent upon the histological and pathological changes that occur in the transplanted bone. There is a considerable difference of opinion on this subject among observers of equal skill and experience, and I do not believe that the question will ever be settled definitely from the pathologist's point of view, for not only do results vary with varying technique, but it has even been found that among operators employing the same technique, the difference in personal equation produces contrary results. In my opinion the difference in results is caused by:

1 Inclusion with the transplant of more or less of the periosseous osteogenetic layer of the periosteum. 2 Infection at the time of the operation. 3 Injury to the transplant in handling, or from heat, antiseptics, etc. 4 Differences in tissue metabolism of the host.

If the wound becomes infected, a part or all of the transplant, whether it be cartilage or bone, will die. If the infection is controlled without having to remove the graft, the dead portion will be absorbed. The periosteum is more resistant to infection than bone. I have known the periosteum to establish vascular connections with the surrounding tissues and remain in situ after the removal of the bone-graft.

Strict asepsis is essential in this work, for no progress was made in the transplantation of bone until after the introduction of aseptic surgery. No matter how slight the infection may be, there will result a considerable absorption of the graft.

I have not the time to discuss here the various views of experimenters as to the function of the periosteum and its influence in the preservation of the vitality of the transplant and the regeneration of bone. I am prepared to state, however, from my own experience that the periosteum is of great clinical value, in that it adds to the vigor of the graft, and undoubtedly it protects the osteogenetic elements and aids in directing the growth of bone. These functions are greatly stimulated by placing the transplant in direct contact with live periosteum-covered bone.

I will say in conclusion that my cases show that under proper conditions bone may be transposed from one part of the body to another, and that it will retain its vitality and proliferate in its new position, and that the autogenous transplantation of bone and cartilage offers the best means for the correction of the most difficult class of nasal deformities.

2 West 67th Street.

CONTRIBUTION TO THE DIAGNOSIS OF SUBACUTE AND CHRONIC INFLAMMATORY LESIONS OF THE MUCOSA, LINING THE MAXILLIARY ANTRUM OF HIGHMORE. PRELIMINARY REPORT.*

Dr. William Spielberg, New York.

There are cases of subacute and chronic inflammations of the mucosa lining the maxillary antrum, which have been a source of trouble to us in arriving at a diagnosis. The salient features of these cases reside in the following factors:—

1. Their clinical histories lead to a suspicion of maxillary antrum involvement.
2. The X-ray picture gives a shadow over the affected antrum.
3. When punctured the washings are clear.

The procedure that has been employed in the diagnosis of this type of cases, the use of the naso-pharyngoscope, has been touched upon by some, among them Skillern (surgery of the nasal accessory sinuses).

Antroscoping or looking into the maxillary sinus, is accomplished by puncturing the antrum in the usual manner and inserting the naso-pharyngoscope through this opening.

Method of uses: The inferior meatus is cocainized and adrenalized by packing left in for five or ten minutes. The antrum is punctured as far anteriorly as possible. The straight trochar and canula was found most suitable for this work. The antrum is punctured with the trochar held at an angle of 30 degrees to the outer nasal wall or base on antrum. After puncturing, the trochar is removed and the naso-pharyngoscope immediately introduced through the same opening and the antrum inspected.

Inspection of the antrum must be done rather quickly, as bleeding soon begins and obstructs the view. Also prolonged instrumentation of the maxillary antrum causes a marked congestion of the lining membrane which interferes with the examination. In the subsequent examinations however these disturbing features are not encountered, as the antrum becomes accomodated to instrumentation.

A special straight trochar and canula is being made, to enable the operator to puncture the antrum, withdraw the trochar and

*Read before the Section on Rhinology and Laryngology. New York Academy of Medicine, Nov. 23, 1921.

DEFINITION: The word antroscopy is here used to name the procedure of directly looking into an antrum or sinus, i.e., Antroscopy of the Maxillary Frontal or Sphenoidal Sinus. (Antroscopy of the Frontal and Sphenoid Sinus will be reported at a future date.)

insert the naso-pharyngoscope through the canula into the antrum, so as to prevent the lamp and lens from being soiled with blood.

In using the naso-pharyngoscope one must learn to interpret the picture which the lens presents, as there is a certain amount of enlargement and blurring due to the focal length of the lens. In this preliminary report we have used the old type naso-pharyngoscope. The new instrument being constructed will overcome the disadvantages of the Holmes instrument as found in connection with this work. It will be of a smaller calibre and straight in its entire length so as to make also the frontal and sphenoid sinuses accessible.

The following 4 cases briefly outlined will demonstrate the value of this method of diagnosis.

Case 1. Patient M. K., gives a history of very frequent colds in the nose, acompanied by a discharge mostly from the left nares.

Rhinoscopic examination revealed the left nares filled with mucus. No other pathological findings present. The X-ray examination showed the left antrum to be slightly cloudy. The other sinuses were negative.

After clearing the nose, the left antrum was punctured and washed, the fluid returned clear.

Antroscopy of the left maxillary sinus showed marked congestion of the mucous membrane with areas of polypoid degeneration and large polypi on the orbital, facial and zygomatic surfaces of the antrum.

Comments: Following irrigations the discharge has almost disappeared, the lining membrane has taken on a healthier appearance, but the polypi still remain. The patient feels greatly improved and is rather reluctant in continuing treatments. The condition may remain quiescent as a low grade process for any length of time, but the antrum is subject to acute exacerbations with the onset of a fresh infection. With degenerative changes in the mucus membrane and polypi already present, it appears that a radical operation is here indicated.

Case 2. Patient B. S., presented herself on Aug. 8, 1921, with the history of a constant nasal discharge from the left nares.

Rhinoscopic examination revealed the left nares filled with a thick purulent secretion. Nothing else pathological was found. X-ray examination showed a clouding of the left maxillary sinus.

Before puncturing, the nose was cleared of residual pus. No

free pus was obtained on puncture. Washings returned with a few floculent pus particles.

Antroscopy revealed marked polypoid degeneration of the mucosa lining the antrum. The opening into the antrum was subsequently enlarged and some of the polypi removed for examination. They were found to be analogous pathologically to polypi arising from the ethmoids or turbinates.

Comment: This patient has been under observation and treatment for 4 months now. Subjectively she has improved, there being very little discharge present, however from a direct view obtained with the naso-pharyngoscope of the condition of the antrum it is to be noted that in spite of treatment the Antroscopic picture has remained unchanged and one cannot but conclude that nothing but a radical operation will ever cure this patient.

Case 3. Patient I. T., presented herself at our clinic Sept. 23, 1921, with the history of attacks of pain in the left side of the face for the past three years. Pain is intermittent in character and at times radiates to the left ear. The pain is at times so severe that she feels as if her teeth are being pulled. No history of nasal discharge or colds.

X-ray examination of the accessory sinuses showed slight clouding of the left maxillary antrum.

Antrum puncture and *washing* gave negative results, washing returned clear.

Antroscopic examination revealed extensive polypoid degeneration with large overhanging polypi, from the facial, orbital and zygomatic surfaces of the antrum. As much as could be made out of the nasal surface no polypi were visible on it. The cavity itself was free from any secretion.

On October 25, I operated on this patient doing the classical Caldwell-Luc operation under general anesthesia, assisted by Dr. A. A. Schwartz. On opening into the antrum the latter was carefully examined with the naso-pharyngoscope before curetting; in order to properly interpret the preoperative findings. The findings were corroborated by locating the presence of numerous large and small polypi, also polypoid changes throughout the lining mucous membrane of the antrum, excepting the nasal surface where only thickening and edema was noticed. The antrum was then thoroughly curetted, specimen saved for pathological examination and operation completed in the usual manner.* The post operative manner of healing in

*Pathologic examination of the specimen removed was reported by Dr. Eli Moshcowitz, Pathologist of the Hospital, as chronic inflammation and polypoid degeneration of the mucosa.

the antrum has been observed and studied continually with the aid of the naso-pharyngoscope through the nasal route.

Case 4. Patient T. T., presented himself at our clinic Oct. 26th, with the history of marked nasal obstruction for many years accompanied by headaches, and very frequent colds. Patient has a thin watery discharge from the nose.

Rhinoscopic examination: Marked irregular deviation of the nasal septum to right and left. Marked ridge of vomer to left.

X-Ray examination: Before advising a correction of the nasal-septum a routine X-ray examination of the nasal accessory sinuses was ordered, which showed a clouding of the left maxillary antrum.

Antrum puncture and *washings* gave negative results.

Antroscopy revealed advanced polypoid changes with many polypi arising from the mucosa lining the facial and orbital surfaces of the antrum. Polypi can occasionally be seen also from the nasal surface.

From such findings one can easily see the reason for the frequent colds and nasal discharge. There is no doubt that a radical antrum operation is here indicated.

CONCLUSION.

1. In the class of cases here presented, this method of using the naso-pharyngoscope possesses marked advantages in furnishing data for diagnosis.

2. It enhances the value of the X-ray findings which in themselves should never be entirely relied upon.

3. It furnishes data upon which to determine what cases shall be subjected to radical operation.

4. It permits continuous study of the tissue changes in the antrum.

5. From the number of cases examined by this method we find that when the X-ray plate shows a clouding, it almost invariably means that there is some pathologic process going on within the antrum. Whether it is due to acute congestion, atrophy with fibrous changes in the mucosa, polypoid degeneration, hypertrophied mucous membrane, a tumor or fluid, can only be determined by an antroscopic examination of the sinus involved.

6. The degree of clouding on the X-ray plate is no indication of the extent of disease or involvement present, as an acute congestion of the mucosa will give a marked clouding on the plate, while extensive polypoid degeneration may give only a slight clouding.

CONCLUSIONS CONCERNING THE SO-CALLED CONNELLAN-KING DIPLOCOCCUS.*

DR. JAMES JOSEPH KING, New York.

On April 22, 1915, I presented before this Section a paper entitled "Case Simulating Sarcoma of the Tonsil Caused by a Gram Negative Diplococcus." I presented this patient for the purpose of calling attention to a gram negative diplococcus found in the tonsils by Mr. John J. Connellan of the Higgins Laboratories.

Dr. Dwyer in his discussion said that the case had been especially interesting to him, for in the work at the Manhattan Eye, Ear and Throat Hospital they were continually meeting with this diplococcus, but had not considered it of especial pathogenic importance, but that it belonged to the group of gram negative organisms which is found in the throat all the time. (Proceedings of this meeting published in THE LARYNGOSCOPE, 1915, pp. 380, 382.)

A few days after presenting the above report I was informed that for the sake of classification and convenience this gram negative diplococcus had been designated, for lack of a better name, the Connellan-King diplococcus.

Before the Ear, Nose and Throat Section of the American Medical Association at Detroit in June, 1916, I presented a paper entitled "Further Observations on the Connellan-King Diplococcus Throat Infections, Their Sequalæ, with Especial Reference to Arthritis." In closing my paper this statement is found (quoting from the Journal of the American Medical Association, Vol. 68, pp. 91, 93): "All the laboratory work has been done by Mr. John J. Connellan of the Higgins Laboratory, and I take great pleasure in expressing my appreciation of his valuable assistance." My work was purely clinical.

Mr. John J. Connellan, in discussing this paper, said (I quote his words from the Journal of the American Medical Association in full, same reference as above): "About two years ago, Drs. Hasbrouck and Palmer of New York asked me to examine their extracted teeth and ascertain if endomeba buccalis was present. We were unable to find the endomeba in any case. As several of the cases showed abscesses, cultures were made. The organisms found were the streptococcus viridans, from the apex of the tooth, and S. hemolyticus from abscesses. We also found in some of the cases

*Read before the Section on Laryngology and Rhinology, New York Academy of Medicine, November 22, 1922.

a gram-negative diplococcus which I had not seen before, nor was there anything in literature calling attention to this organism. I then asked Dr. King if he would make cultures from other parts of the throat and mouth. The result of such work showed this organism present in the crypts of the tonsils and around the teeth. Since that time we have found it in numerous cases at the apex of extracted teeth, some of which were decayed and others in good condition, but in which the Roentgenogram showed abscess formation. This organism is a typical bean-shaped gram-negative diplococcus. It is slightly smaller than the gonococcus when it has attained its maximum growth on its best growing medium. I have been unable to find this organism outside the mouth and throat. Its best growing medium is human blood agar with a little veal serum added. The main point in its growth is the reaction of the medium. On not more than 0.2 per cent acid will the organism grow. In preparing the medium it is absolutely necessary to use the titration method. Litmus paper should never be depended on. It does not produce acid as produced by other gram-negative diplococci, described by Dunham, from the nose and throat. In using the Hiss sugar serums, we get no reaction except coagulation of albumin, showing that it is not a gas producer; which brings to mind why when found in these apparently good teeth with abscess formation at the apex there was no history of pain by the patient. The organism is best grown at a temperature from 39° to 40° C. It has a characteristic appearance on the medium, colony being a light, dull yellowish brown with a rounded contour. The size of the colonies is approximately that of the staphylococcus albus. Dunham, Van Lingelshein and Elser and others have reported several gram-negative organisms found in the mouth and other parts of the body, but this organism does not compare with any that these investigators have reported. As to the animal injection, intra-peritoneal injections of guinea-pigs, dogs and white mice produced no symptoms. Two cubic centimeters of sterile salt solution (a cubic centimeter containing approximately 100,000,000) were injected into the marginal vein of a rabbit, producing death in four days. The organism was recovered in the heart. Complement fixation experiments are now being worked out by an investigator in New York City."

This paper, read before the American Medical Association, brought forth a great deal of discussion throughout the medical world. I have made an earnest endeavor since that time to ascertain the exact status and correct classification of this diplococcus.

Cultures were sent to various laboratories for study, classification, and a report. I have failed to receive from any laboratory or any bacteriologist a report of any kind upon which I could arrive at a conclusion. The war came along and we all got into the service, and the matter was dropped for the time being, due to the pressure of other things. It has been in my mind always to have it cleared up. I therefore, on October 11, 1922, sent the following communication to Mr. Connellan:

"October 11, 1922.

"Mr. John J. Connellan, c/o Higgins Laboratories, 40 East 41st Street, New York City.

"Dear Sir: I am very anxious to have all the data in connection with the Connellan-King diplococcus, as I have learned that there has been a denial made as to the correctness of the existence of such a diplococcus.

"I intend to have an independent investigation made into this matter at my own expense, and you will appreciate the need of exact information so that fairness to both you and myself will result.

"Awaiting your prompt reply, I am

"Yours truly, (signed) James J. King."

To this letter I received the following reply from Mr. Connellan:

"October 13, 1922.

"Dr. James J. King, 40 East 41st Street, New York City.

"My Dear Dr. King: Your registered letter of October 11, *in re* Connellan-King diplococcus, at hand. I am surprised that this matter should come up again. If you will recall, I wrote you in the early part of 1917 and requested that my name be henceforth not used in connection with any type of bacteria. I was under the impression that no one had the right to use that term, due to the inability to identify the above organism. If any one has used the term Connellan-King diplococcus, I fail to understand how he could truthfully do so. I have not used it since writing you the letter mentioned above and do not intend to. Furthermore, I still hold to the subject matter contained in my letter sent you in the early part of 1917.

"Very truly yours, (signed) John J. Connellan."

This statement, dated October 13, is the first statement upon which I could base any kind of a further report. In this letter of Mr. Connellan's I have the statement of inability to identify the above organism. Inasmuch, therefore, as I have made reports describing conditions due to an infection, and successfully treated by

the eradication of an infection in the mouth and tonsils, of a gram-negative diplococcus, as reported to me by Mr. Connellan of the Higgins Laboratories, and I have his statement now of his inability to further identify this organism, I desire to publicly announce to this Section, upon this statement of Mr. Connellan, his inability now to identify this organism he formerly found, and named the Connellan-King diplococcus. I must, therefore, conclude that the conditions described in my previous papers were due to a throat infection, in the light of the present statement, of unknown identity. Results obtained by vaccines must be ascribed to an autogenous vaccine made from a culture, the identity of which is unknown. I have reported many interesting conditions, such as arthritis, nephritis, cardiac conditions, etc., which have been cured by the eradication of an unknown infection. I believed at the time that the infection was what had been designated as the Connellan-King diplococcus. The patients were treated with autogenous vaccines made from the tonsils and the results were generally good. I also desire to state that I have followed many of these cases during the last eight years and the clinical observations I made upon them at the time were correct in every particular, and the results obtained clinically without exception were as stated at the time of the papers.

I have studied the cultures made from my patients with unusual attention for a clinician. The cultures made from the crypts of the tonsils nearly always show a mixed infection. Occasionally I get a report of a pure culture of some organism. The identity of the bacteria found in many cultures is frequently diagnosed differently in different laboratories. There are many varieties and many strains of streptococci. Some bacteria will appear as a diplococcus under one condition, as in tissue, or on a smear, for instance, and when well known laboratory. The hospital report was staphylococcus, or staphylococcus. Last summer I saw a fatal case of bacteremia of tonsillar origin in consultation. Two cultures were taken from the tonsil, one was left at the hospital, and one was taken to another well known laboratory. The hospital report was staphylococcus, and the private laboratory reported a pneumococcus.

Much experience with laboratories has led me to believe that in many instances bacteriological diagnosis cannot be accurately based upon superficial or casual examination, but requires more or less extensive study at the hands of specially qualified investigators, and that at best it is not always an exact science. Especially from my experience do I regard it as desirable that more attention should be directed to the differential diagnosis of the gram-negative cocci that

appear in cultures from the tonsils and nasopharynx. The willingness at the present time to group such organisms under the caption micrococcus catarrhalis or any other general name is quite in contrast to the attention directed to gram-positive cocci with their differentiation into many varieties and even strains of staphylococci, streptococci, and pneumococci. Perhaps the gram-negative cocci do not have the same pathological importance; nevertheless, I believe they are worthy of more careful consideration than they at present receive.

My clinical conclusion is that it does not matter what the organism is called—whether a gram-negative diplococcus, a streptococcus of any variety, or a staphylococcus, or pneumococcus, or what not. Almost any of them may be pathogenic and even produce death under certain conditions.

Another conclusion reached several years ago, heretofore unpublished and recently published by others, is that in subacute and chronic conditions the volume of infection is more important than the variety in many cases. By this I mean that a culture plate which shows an abundant growth may indicate a more serious trouble than a scant growth would indicate. Likewise the eradication of the massive infection will result in the greater improvement of the patient's condition.

Finally, as a matter of record, and in order to make clear my own position, I desire to publicly withdraw any previous statements made by myself on information and belief as to the existence of an independent organism, known as the Connellan-King diplococcus.

I am grateful to Drs. Emil Mayer, Thomas J. Harris, Duncan MacPherson and E. E. Smith for valuable suggestions in the preparation of this statement.

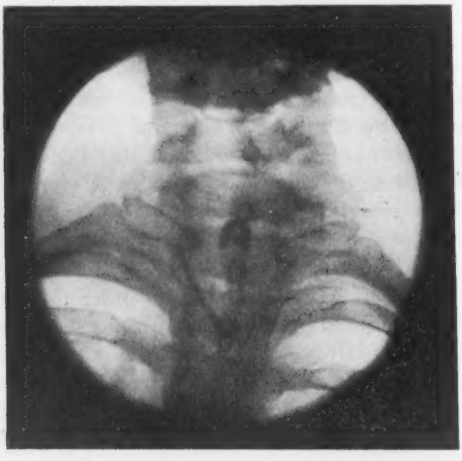
40 East Forty-First Street.

REPORT OF CASE.

Dr. R. S. Moore, Syracuse, N. Y.

A girl, 14 years of age, was examined by me in July, 1920, with the history of persistent hoarseness, not marked, but ever present, since an attack of scarlet fever two years previous. She complained of frequent sore throats, of having acute tonsillitis three or four times each year with the posterior pharyngeal wall continually irritated. She said she could not breathe through her nose well, and slept with her mouth open.

The examination revealed nothing abnormal in the nose. The faucial tonsils were greatly hypertrophied with cheesy debris exuding from the crypts. A large amount of adenoid and lingual tonsillar tissue was present. The arytenoids were very red, the inter-arytenoid space congested, and the chords pink. The patient being very easy to examine with the indirect mirror, I noticed a white body just below the cricoid cartilages moving laterally on inspiration. The X-ray revealed the foreign body to be an open safety pin in the position shown in the accompanying picture. It was removed under ether. The hoarseness entirely disappeared in about six weeks.



The case is of interest in that it demonstrates that a good sized foreign body may lodge in the trachea close to the larynx, and produce almost no symptoms. It shows again that all doubtful conditions in the respiratory track, even hoarseness, should be radiographed to absolutely exclude a foreign body.

622 University Bldg.

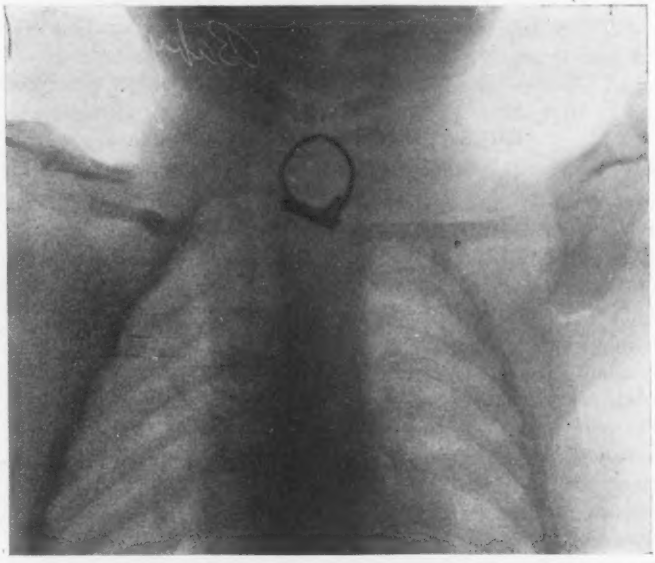
WIRE RING IN ESOPHAGUS: REMOVAL.

Dr. Elbyrne G. Gill, Roanoke, Virginia.

Patient, W. H. S., age seven months, referred to me August 3, 1922, by Dr. W. W. Chaffin, of Pulaski, Virginia.

Parent gave the following history: For past two months child has been having choking spells after nursing. Otherwise history negative.

I referred the patient to Dr. J. T. McKinney for an X-ray examination and his report is as follows: "Chest shows the shadow of an



opaque metallic ring lying in the esophagus, the lower border of the ring being opposite the sternoclavicular artculation. The heart and mediastinum are slightly pushed to the right side."

I sent the child to the hospital and with the use of the Jackson's small size laryngoscope and laryngeal grasping forceps I removed the wire ring without any anesthetic, either local or general. The time of the operation was one minute. Assistant, Dr. F. A. Farmer.

The child left the hospital the following day in good condition. I have heard from the parents since and the recovery has been uneventful and complete.

After receiving the Roentgenologist's report and close questioning of the parents the following fact was brought out which they did not give at first: they stated that the older children, about two months ago, were making wire rings and they remembered the baby playing with one of the rings and it was about this time the child's choking spells began.

In all cases of suspected foreign bodies in air or food passages a careful history of the case is always important.

612 MacBain Building.

CRESATIN (Dr. N. Sulzberger).

DR. M. D. LEDERMAN, New York.

My object in again calling attention to this active adjuvant of our topical remedies is that frequent inquiries have been made as to its availability.

Owing to disturbances in the chemical industry during the world's war, this effective agent's output was necessarily limited, and only a restricted supply was on the market. Recently, however, it is again being manufactured, so that there should be no difficulty in obtaining the desired quantity.

For many years the writer has empolyed this non-escharotic cresol preparation with pleasant results in diseases of the upper air passages and ear. He was impressed with its prompt activity, and in his original observation,[1] attention was called to its decided effect in furuncular infection of the external auditory canal. In frequent instances, if applied early, suppuration was checked, and reinfection of neighboring areas did not occur.

Being less of a coagulant of albumen than any other of the cresol group or carbolic acid, its penetrating properties are more pronounced, which probably accounts for its rapid local action. It is much less toxic than any of the above substances.

This acetic ester of metacresol retains the characteristic virtues of metacresol, without its caustic or toxic features. It has been applied to the eye[2] with special technique, in gonorrheal ophthalmia, in full strength, after local anesthesia, with excellent results.

Its antiseptic and analgesic qualities have been observed by the writer, following its local application in ulcerative tubercular laryngitis. Of late it has been used as a topical application in cases of acute follicular tonsillitis with prompt effect, and also for the relief of post-operative pain in tonsillectomy.

It is a reliable remedy in folliculitis of the nasal vestibule, and in ulcerative lesions about the mouth. In the removal of diseased nerves or pulp in the dental root canals and cavities, its analgesic action is very satisfactory, and at the same time is a splendid antiseptic to the cavity invaded.

Cresatin is soluble in animal and vegetable fats, also in alcohol, but not in water. It is stable, does not discolor or undergo any other change in standing. Being a definite chemical compound, it is always uniform, distilling without decomposition at 214°-215°.[3]

In catarrhal manifestations of the upper air passages, it may be satisfactorily employed as a prophylactic and antiseptic, in the form of an inhalation, by using ten (10) to thirty (30) drops to a pint of steaming water.

Combined with some oily base, it may be nebulized into the nasal and lower air passages. It mixes well with essential oils, and a few drops of coriander or cassia added, offer an agreeable combination.

1. Cresatin—A New Caustic Cresol. THE LARYNGOSCOPE, March, 1911.
2. Gonorrhoeal Ophthalmia. Dr. Cyril Barnett. *Med. Record*, 2/5/16.
3. For further information of its chemical qualities see "Study of the Antiseptic and the Pharmacologic Properties of Meta-cresol Acetate." *Journal of Pharmacology and Experimental Therapeutics*. Vol. II, No. 6, July, 1911.

58 East 75th Street.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

November 22, 1922.

A Case of Rhinophyma and Its Cure.* Dr. J. Eastman Sheehan, New York.

This patient, a man of 50 years, was referred to me by Dr. Cohen; a paralytic of the left arm and leg from an attack of apoplexy some five years past, with a hideous deformity of the nose, so incapacitated him that it was impossible to obtain work. Since the repair of his nose, he has obtained a post, receiving twentyfive dollars per week.

Rhinophyma is a disease which is the outgrowth of acue rosacea. This condition generally results in either a moderate or severe modulolobulated disfigurement of the nose. As a result of a persistent hyperemia, there occurs a hyper-activity of the sebaceous glands, a dilation of the blood vessels, ending in hypertrophy of the skin due to new connective tissue formation, with the result that there is produced many follicular sinuses. The disease generally affects the lower antero-lateral aspects of the nose; that is, the part of the nose which is supported with cartilage, gradually blending itself with the normal skin covering the bony framework. In some cases, there is present a true osteitis of the nasal bones and the nasal processes of the maxillae, producing a wide upper nose, thereby adding to the deformity. This added deformity must be corrected by wedging the bones (see Sheehan, LARYNGOSCOPE, September, 1922).

Operation: The parts are cleansed with soap and water followed with alcohol and ether, until there is a decided glow. The mucous membrane of the nose is anesthetized with a solution of 2% cocain muriate; the external skin of the nose is widely infiltrated with one-half per cent solution of Novocain. With a graft knife of the Thiersch order, the hypertrophied skin is completely shaved down to the sinus epithelium. Bleeding, which is liable to be smart, is generally controlled by applying pressure. As a result of the shaving process, which is carried to the basal line of the sinus epithelium, there results a raw area dotted here and there with bits of epithelium, which causes a quick epithelization of the parts. The exposed raw area is covered with ambrine gauze as used at Sidcup, England. As a rule, after ten days epithelialization is complete.

Dr. Sheehan said he hoped some time in the near future to have the pleasure of presenting a series of such cases before the Section.

Case for Diagnosis. Dr. George E. Davis.

Mrs. J. R. S., Aet. 45.—Consulted me June 27, 1922, on account of a sore throat which had troubled her off and on since childhood till about four years ago, and more or less constantly since.

Family History: Paternal grandfather died with cancer of stomach; maternal grandmother and two of said grandmother's sisters died with cancers on face, breast and calf of leg respectively. Mother died with cancer of uterus at age of sixty. One brother, Aet. 47, has had cancer of nose, back of ears and knee operated. Has one brother, Aet. 53, good health.

Personal History: Two years ago had a tonsillectomy and since then the tonsil sinuses, pillars, posterior and lateral pharyngeal walls, soft palate and uvula have not been entirely free from a grayish, soft gelatin

*Presented before the Laryngological Section of the New York Academy of Medicine, Wednesday evening, November 22, 1922..

like film or membrane which forms and exfoliates at intervals of three to five days, leaving a raw and occasionally small bleeding surfaces. This membrane is rather tenacious, but can be removed with hydrogen peroxide. There is some infiltration and lymphoid masses behind the posterior pillars with a white papular point of infection here, there observable when the membrane is removed. There is no lymphatic gland involvement.

A microscopical examination of smears from the pharynx, by Dr. H. T. Brooks, "showed occasional short streptococci, spirilla, leptothrices (myotic) and numerous pneumococci. No vincent bacilli were found." A blood serum Wassermann, made by Dr. Brooks, showed a negative reaction.

This patient has consulted several specialists in New York, also at Johns Hopkins; has had all kinds of examinations without a definite diagnosis; much, very much treatment—local and general—but I am sorry to confess without seeming benefit.

As the condition is painful, particularly in eating, and the patient is losing weight and is altogether quite miserable, I present the case with the hope that some light may be thrown on the diagnosis and treatment.

Some years ago, I spent a considerable time with the lepers in Cuba and on the Island of Ponce. This case of Dr. Davis' has greatly impressed me as being one of tubercular leprosy of the throat. The lesion in this woman's throat is quite similar to many I have seen amongst the lepers.

DISCUSSION.

DR. MAYER said that this was a case that ought to be followed up until the nature of the exudate was determined. As one saw the picture for the first time, it seemed to be like a leptothrix or some similar condition of a recurrent nature. He then cited a case which he had published a number of years ago, where the patient had a similar recurring membrane, which covered the entire soft palate and recurred every month, for a number of years. The patient could herself lift the membrane and peel it off as one would a potato. She was sent to Dr. Mayer for diagnosis and it was finally concluded that the condition was due to the presence of the Friedländer bacillus. Dr. Davis should send the patient to the laboratory where the pathologist could make his own smears and take a number of cultures himself and determine the causative agent.

He then suggested that possibly there might be some connection between the condition and the previous operation on the tonsils, there being much cicatricial tissue present.

DR. HARRIS said that Dr. Davis had given him the opportunity of seeing the case in the early summer. From the history given by the patient she had reason to feel a good deal of concern about the possibility of malignancy. As he recalled the case when he first saw it, the picture had changed rather for the worse since last July. At that time he had suggested to Dr. Davis the possibility of its being something of the leptothrix order, and the desirability of having a bacteriological examination. As Dr. Mayer had said, these cases are not common and are apt to be very baffling to treatment. It would probably be a long task to find the organism concerned, and as Dr. Mayer had suggested, there was also a possibility that there was some connection between the condition and the tonsillectomy that had been performed.

DR. MAYER remarked, in connection with the astonishing suggestion of leprosy, that nowhere in the history of American medicine has a case of leprosy ever been presented in a person that was not an inhabitant of a country where leprosy was endemic. He had seen leprosy in a child brought up in China, and unless this patient has had some such exposure, that did not seem a probable diagnosis.

DR. COFFIN inquired whether the patient had had a thorough physical examination, and whether the feces, blood, etc., had been examined.

There was evidently some underlying disease which was the cause of the false membrane. He then suggested the use of monochloracetic acid of various strengths over alternating portions of the lesion.

DR. DAVIS said that the point that puzzled him was the family history—four to six members of the family having died of carcinoma—which made him feel rather apprehensive. He had seen the patient only once or twice before leaving on his vacation abroad when he referred her to Dr. Harris. She had been under the care of some general practitioner, and he was not familiar with what examinations had been made. The blood Wassermann test was negative. Smears from the throat had been examined and the report received from Dr. Brooks suggested the possibility of some mycosis, but it did not behave like that. As in the case mentioned by Dr. Mayer, the patient could herself pull the membrane off very easily. She had been given auto-vaccination from cultures of staphylococci and streptococci obtained from the throat, but no improvement whatever resulted.

Neo-salvarsan was then used on the lesion, but the membrane returned worse than before. Various kinds of local applications, as mercurochrome, silver nitrate, etc., had given no beneficial results.

Dr. Davis said he would try to carry out Dr. Mayer's suggestion and send the patient to some good bacteriologist who would be willing to make half a dozen cultures and try to find the bacillus responsible for the condition. It had been a very baffling case; the patient had been seen by a number of eminent men, and had been to Johns Hopkins for two months, where all sorts of examinations were made, but no diagnosis was made in the case and the patient returned to New York, disheartened and disgusted.

He was inclined to agree with Dr. Coffin that although the diagnosis might never be made, he hoped it might be possible to find some remedy that would relieve the patient.

Pachydermia Laryngis. Dr. Max Unger.

The patient is a woman of about 55 years, married and the mother of nine children. Her laryngeal symptoms date back three years, when she had an attack of the grippe which left her with a laryngitis that lasted 3 months. At that time a Wassermann test was negative. After the laryngitis cleared up she remained free from laryngeal symptoms until ten months ago, when she had another attack of the grippe. She states that while recovering from this she drank a glass of ice water, and suddenly developed hoarseness, pain on swallowing, and dyspnea. These symptoms continued and were present when she came to Dr. Harris' clinic at the Post-Graudate in April last. Examination at that time showed the larynx markedly congested in all its structures, so that the rima glottis was much narrowed. There were no ulcers or tumors in the larynx. The pharynx was red and the nose showed a rhinitis sicca. A Wassermann test was negative. In view of the uniform thickening of the laryngeal mucous membrane and the absence of tumors and ulcerations, a diagnosis of pachydermia laryngis was made. Her symptoms progressed and the lumen of the larynx is still smaller. During the past twelve years she has had five Wassermann tests, all negative. She is presented for suggestions as to diagnosis and treatment.

Replying to an inquiry by Dr. Mayer, Dr. Unger said that the patient was a native of Odessa, Russia.

DISCUSSION.

DR. MAYER suggested that possibly the condition might be due to rhinoscleroma, as the patient came from a district in Russia where rhinoscleroma prevails, and that the diagnosis would probably be established by the removal of a portion of the growth.

DR. HARRIS said he had seen the case several times and had bronchoscoped, or rather esophagoscoped the patient during the summer, but that since then there had been a very decided advance in the condition.

The greatest amount of obstruction seemed to be in the posterior commissure and the lumen of the larynx was encroached upon, etc. Dr. Mayer's suggestion in regard to rhinoscleroma might very well be worth following up.

DR. UNGER said he had thought of rhinoscleroma several times, but had ruled it out because in rhinoscleroma one sees masses of rhinosclerotic tissue invading the larynx—the masses being fairly well circumscribed and changing the structure of the larynx. In this case, there was no part of the larynx especially hypertrophied more than another; all the structures of the larynx were distinct and could be easily made out. No point could be selected as being the starting point of the stenosis. A section, however, would be made for examination.

Ethmoiditis and Sphenoiditis. Dr. T. J. Harris.

The patient was a young woman first seen at the Post Graduate Hospital last summer, complaining of nasal obstruction. There was no predominant symptom, such as headache, pronounced nasal discharge, etc. She had previously had a submucous resection, etc. The case was examined by Dr. Unger, who observed a decidedly thickened septum, which was regarded as the cause of the trouble and the submucous resection. The Wassermann reaction was negative. The case did not respond to treatment, and when observed by Dr. Harris a month or six weeks previously there was a very decided swelling of the turbinate bodies, a polypoid condition of what remained of the middle turbinate on the left side and clinical evidence of ethmoiditis, calling for an X-ray picture. The picture showed decided cloudines of the right frontal and cloudiness of the left ethmoid. The pictures were taken on a Wednesday, and on the following Wednesday, under local anesthesia, the remainder of the ethmoid cells was exenterated, and the anterior sphenoidal wall was removed, revealing a considerable amount of muco-purulent secretion and polypoid material. Since then the breathing and general symptoms have been better, and so far as that side of the head was concerned the patient was feeling very well; but there was some pain on the other side.

Some of the interesting features of the case were: First, there were not sufficient clinical symptoms to justify a diagnosis of sphenoiditis. It was not until the patient was on the operating table that that condition was recognized. Second, the findings from the X-ray picture were negative, so far as the sphenoid was concerned, the roentgenologist reporting ethmoiditis, etc.

It seemed that it might be one of those large ethmoidal cells with an abnormal sphenoid, and as a matter of scientific interest, a picture was taken with the aid of bismuth paste, etc. It is a question of whether we can or cannot demonstrate the pathology of the sphenoid from the X-ray picture. There is today a difference of opinion on the subject. At the Post Graduate Hospital they say that some can and some cannot. In a conversation with Dr. Mayer concerning this case, he inquired the time that elapsed between the taking of the picture and the operation; and upon being told that it was a week, he said that it was perfectly possible to have a clear sphenoid a week before operation, and yet show the condition presented at operation. A third point of interest was the suggestion from the pathologist that a Wassermann test should be made, as the picture pointed very decidedly toward syphilis. The Wassermann reaction at the outset of the condition was negative. Careful questioning of the patient's husband gave a negative history, and there was nothing in the history of the patient which pointed strongly to that; yet there was evidently a possibility that the sphenoiditis was of specific origin. The report at first was questionable, and later it was ruled out, there being nothing characteristic found.

DISCUSSION.

DR. LAW, referring to Dr. Harris' query as to whether sphenoid disease could be demonstrated by the X-ray, said that that was the most diffi-

cult portion of the head in which to show any condition; but that any disease involving the sphenoid to such an extent as to require surgical procedure could be shown, only it was necessary that the plate should be made in a certain definite way with an absolutely perfect technique. The sinus being in the middle of the skull, the slightest movement of the patient's head or change in the direction of the X-ray would make a difference in the position and appearance of the sphenoids. Certainly any sinus case which did not show a shadow of the sphenoid was suspicious, and required an examination of the region made in a special way, showing both sphenoids, so that comparisons could be made. In this case, there was no shadow indicating the sphenoid, etc., therefore, a more thorough examination was required. When the sphenoids are suspected, they require further examination. The examination is not ordinarily made with special reference to the sphenoids, because of the added exposure of the patient's head, but when they are suspected that additional exposure is warranted.

He then analyzed the picture and showed that it indicated a chronic polypoid degeneration with no sphenoid shadow, indicating that the case was suspicious.

DR. HARRIS said he would gladly follow Dr. Dwyer's suggestion and have the patient treated accordingly, and would report the result later.

Foreign Body Removed from Nose. Dr. Michaelis.

The patient had come under observation two or three months before for the relief of severe headache on the right side from which he had been suffering for two years. Inspection revealed a messy condition on the floor of the nose—granulations, pus and a dark colored mass which looked and felt like a sequestrum. There was a marked fetor also which patient complained about. Treatment was directed to clearing away the obstructions. Removal of the hard mass was somewhat difficult owing to sharp septal ridge and pedicle-like attachment of the mass. Examination after removal showed the mass to be a large cherry pit.

The unusual feature of this case is the finding of such a body in the nose of an adult, and that the patient had no recollection of how it got in. He stated, however, that he lived in the country as a boy and that they used to swallow cherries, pit and all. Doubtlessly he must have regurgigated this pit after an attack of gagging. Patient has also a severe infection of the antrum of the same side which appears to have set in when pain began and long after the entry of the body.

There was little deposit of salts on this body, which is unusual, considering that it was in the nose so long a time (at least 20 years). It is also interesting to note that it gave no trouble for so long a time.

Tumors of the Jaw from the Standpoint of the Rhinologist. Dr. J. D. Whitham.

Although new growths of the jaws are relatively uncommon, nevertheless their early recognition and early treatment are matters of importance. Malignant neoplasms of the jaws grow into the accessory sinuses and toward the base of the skull. Scudder states that "an intimate knowledge of these sinuses is necessary to the operating surgeon." The rhinologist had this knowledge and should possess the ability to diagnose and treat these conditions.

In the few minutes allotted, I shall attempt to briefly discuss the more frequent neoplasms of the jaw, giving the salient points in diagnosis and treatment.

An Epulis is probably the most common tumor of the jaw. It is a connective tissue growth seated on the inner border of the alveolar process of the jaw about the teeth. It is seldom larger than an olive and is usually covered by intact mucous membrane. It nearly always occurs in young adults. Two varieties are described: the fibrous and the more common gaint-celled type. The latter is softer, more vascular and more irregular in shape than the former. Metastases do not occur, but the disease is locally malignant. The condition is treated by extracting

a tooth on each side of the tumor, notching the bone in front and behind and removing the alveolar process with growth attached by a chisel. When this is done the condition never recurs.

Sarcoma of the jaw is extremely rare in childhood and when seen is usually of the giant-cell type. Most frequently is it found between the ages of fifteen and sixty. Trauma is believed to be an important etiological factor. It is more frequent in the lower jaw and is apparently about equally as common in the jaws as carcinoma. A rare but very malignant form originates from a blood vessel. This is called a perithelioma. The two types of sarcoma most frequently seen are the central or medullary type originating from the bone marrow, and the peripheral or periosteal type, which, as its name implies, grows from the periosteum. The medullary type is surrounded at first by a definite shell of bone and periosteum. Often it is difficult to distinguish such a growth from a benign cystic tumor. The tumor growing rapidly destroys the bone, breaks through its capsule and invades the soft parts of the face or neck. The peripheral type, growing from the periosteum, does not cause extensive destruction of bone and is not surrounded by a definite bony shell. It is softer than the bone to which it feels firmly attached and has definite outlines. In both jaws the body and alveolar processes are attacked with equal frequency.

The symptoms of sarcoma of the upper jaw are a swelling of the jaw with evidences of necrosis of bone; tenderness along the alveolar border; a tender spot on the cheek; loosening of teeth; ulceration extending to the hard palate; obstruction of one or both nasal cavities from a growth often resembling a nasal polyp; a continuous foul purulent nasal discharge with intermittent nasal hemorrhages; a tingling and numbness of the upper lip and cheek; a flattening and later a bulging of the hard palate; diplopia; edema of the eyelids and face; empyema of the maxillary sinus and evidences of a progressive necrosis of the jaw. The rhinologist is often called on early in these cases. With the aid of X-ray and his experience he is especially qualified to make an early diagnosis. In reaching a diagnosis the following conditions must be exeluded: alveolar periostitis, gumma, dental cyst, carcinoma and odontoma.

The treatment of sarcoma of the jaw usually entails an extensive primary operation, although in less malignant types a limited operation may be undertaken. The advantage of using the actual cautery in removing these growths is well established. The use of radium and X-ray in treatment will be briefly considered when carcinoma of the jaw is discussed. The results of all forms of treatment are so bad and the mortality so high that very early diagnosis seems to offer almost the only hope. By studying and thinking more about these conditions and by co-operation with the oral surgeon, rhinologists can do much.

Another type of jaw tumor which is relatively common and which should be thoroughly understood is the odontoma. An odontoma arises from a portion of a tooth follicle or tooth germ as the follicle is sometimes called. To understand how this occurs, a rapid review of the development of a tooth is necessary. A tooth, like a hair, develops in early fetal life from an invagination of the epithelial layer into the mesoderm. In this way, a flashed shaped epithelial cord is formed which is called the enamel organ. The mesoderm of the rudimentary jaw grows upward and is called the papilla. This becomes completely surrounded by the enamel organ, which is, in turn, surrounded by the sac of the tooth. The sac, the enamel organ and the dentin papilla together comprise the tooth follicle.

From the enamel organ of epithelial origin grows the enamel of the tooth. When certain of these epithelial cells of the enamel organ in the root of the tooth cease to form enamel, they may remain as epithelial cell rests. It is from these cell rests that the adamantine epithelioma or odontoma is believed to grow. This is a slow-growing immovable tumor. It is more

frequent in the lower jaw and is occasionally cystic. The patient is usually a young adult. This growth is locally malignant. One of its most interesting features is its microscopical resemblance to a carcinoma. The treatment is entirely surgical. If any doubt exists as to its malignancy, a resection should be performed. No case of recurrence after complete removal has ever been reported.

Cysts of the jaw are classed among the odontomata, as they also grow from the tooth follicle. These are of importance to the rhinologist, especially when occurring in the upper jaw. They are of two kinds—the periosteal, or root cyst, and the follicular or dentigerous cyst.

The root cyst is the more frequent. It arises probably from the epithelial sheath of the enamel organ beginning as a granuloma at the root of a tooth. A periodontitis ensues with degeneration and softening of the granulation tissue and cyst formation. The fluid is a clear yellow and contains cholesterin and cast-off epithelial cells. In the upper jaw growing in the line of least resistance, it may encroach upon the antrum or upon the mouth or nasal cavity. In the lower jaw it is seen on the lingual aspect under the mucous membrane. The teeth are often displaced to one side. Fluctuation and the parchment-like crackling may be obtained. In the upper jaw, the floor of the nose and the floor of the antrum may be displaced upward. Exploratory puncture and the X-ray aid in diagnosis and are usually necessary when an infected root cyst has perforated into the antrum. The treatment is best carried on by the Partsch operation. This consists of a complete removal of the oral wall of the cyst and opens the cavity fully into the mouth. It always cures the condition.

The follicular or dentigerous cyst, though not so frequently encountered as the root cyst, is nevertheless a common form of benign odontoma. In the upper jaw it occurs as an olive-sized swelling on the outer side of the alveolar process. It does not seem to encroach upon the lingual side. Its wall feels thin and on palpation the parchment-like crackling may be felt. It appears usually during or shortly after the second dentition. It often develops from an unerupted canine or molar tooth and the absence of this tooth may be noted. A dentigerous cyst arises from the follicle of an unerupted tooth and at operation one or more tooth-like objects will be found in its cavity. It is usually monolocular and may grow to great size. The lower jaw in the molar region is the most frequent seat. Treatment is entirely surgical and consists of a complete removal of one wall of the cyst, thorough curettage of the interior of the cavity and packing with iodoform gauze. This can usually be done through the mouth and in this way little, if any, deformity will result.

The last type of jaw tumor to be considered is carcinoma. This will be spoken of briefly, for it is a subject quite familiar to us all. It is four times more frequent in men than in women. In the jaws it is almost always primary. The central carcinoma of the upper jaw is nearly always primary in the maxillary sinus and is usually of the cylindric-cell type. More commonly, however, carcinoma begins in the oral or nasal mucous membranes. When the disease begins in the nose or sinuses, polypi or polypoid growths are usually present. A bloody discharge from one nostril with nasal obstruction should always excite suspicion. Neuralgic pain in the cheek is often an early symptom. Bulging of the antral wall apparent in the cheek, or bit or nasal cavity is a later symptom. Enlargement of the cervical glands is a late manifestation, especially when the upper jaw is the seat of the disease. When the antrum is attacked a purulent sinusitis is nearly always associated. The X-ray is invaluable in the diagnosis of this condition.

After operation the average time for recurrence, according to Martens, is nine to ten months. It has been reported, however, as late as after eleven years. The results after operation are even worse than is the case with sarcoma. The use of radium and X-ray with early resection by the actual cautery seems to offer more hope. The treatment of an operable case of carcinoma of the upper jaw should be, in brief, as follows: About two weeks of preliminary intense treatment by radium should be given, using

bare-tubes and packs. During this period the teeth should either be extracted or carefully scaled and cleansed. The nose, throat and mouth should be cleaned every few hours with a mild spray and wash. The patient should be made acquainted to the stomach tube, that he may be less disturbed by its use after operation. Very light ether anesthesia by the intratracheal method with careful packing of the pharynx will be found essential. A preliminary ligation of the external carotid artery on one or both sides is usually advisable. Everything should be in readiness to compress the common carotid artery if this step should later become necessary. The Rose position is believed by many operators to be the best. A suction apparatus is extremely helpful. The resection of large growths is best done by the cautery. Following operation, the patient should be fed by the stomach tube for about seven days and external X-radiation should be given.

My object in reporting the following case is to show the possibility of removing one-half of the mandible without causing a very conspicuous deformity and to emphasize the usefulness of a preliminary ligation of the external carotid artery. In hemi-resection of the mandible there is a great loss of blood when the ligation is omitted, despite the dexterity of the surgeon. The ligation serves to minimize the loss of blood, injury to the parts in manipulation and time of operation.

Patient, K. F., age 45, female. This woman has been an inmate of the King's Park State Hospital since 1902. She is feeble-minded.

Family, social and previous medical history have no important bearing on the case. In December, 1921, it was noticed that the patient was developing a swelling on the left side of the mandible. It was thought at first that this was a dento-alveolar abscess and the molar teeth were removed. The tumor, however, continued to increase in size and by February, 1922, had extensively involved the alveolar mucous membrane, which was ulcerated. On February 19, a section of the growth was removed. This was shown to three pathologists. One said the growth was a carcinoma and two called it a spindle-celled sarcoma. On May 14, 1922, a hemi-resection of the mandible was performed under light chloroform anesthesia. The left external carotid artery was first ligated distal to the superior thyroid artery. This wound was carefully sutured and sealed with cotton and collodium to prevent contamination during the subsequent operative procedures. A vertical incision was then made on the lower jaw in the midline, commencing just below the carmine of the lip and extending downward to below the inferior border of the jaw, severing the soft parts to the bone. The lower end of this incision was then extended backward below the jaw to the angle. The right coronary artery was clamped and ligated. The tumor was carefully separated from the surrounding soft parts. The levator menti, platysma and buccinator muscles were severed by the knife form their attachments to the bone and, while the anesthetist retracted the cheek, the bone was cut from the oral mucous membrane. It was not possible to save the alveolar mucous membrane, as it was involved in the growth. The massiter muscle and stylo-mandibular ligament were next divided with scissors and the mandible was cut through with a saw in the midline. The cut end of the bone was then grasped with large bone forceps and forcibly depressed. This manipulation exposed the tendon of the temporal muscle at its attachment. Here it was cut with scissors, taking pains to hug the bone to avoid injury to Steno's duct. The external and internal pterygoids were next cut and the bone with tumor attached was readily removed by twisting and cutting the capsular ligament with blunt scissors. Up to this point the operation had been almost bloodless. Now a slight venous ooze from the pterygoid plexus was noticed, which was readily controlled by the gauze pack. All glands which could be found were removed. The oral mucous membrane was closed by a chain stitch of chromic cat-gut, the masseter and pterygoid muscles sutured together and a drain of one foot of iodoform gauze was inserted. The skin was closed, leaving an opening for drainage. The time of operation was one hour and forty-

five minutes. The patient made a rapid afebrile recovery. She has had no return of the growth, has gained in weight and does not appear to suffer any inconvenience in eating as a result of the operation.

The growth and slide were shown to Dr. James Ewing, who called it an adamantine odontoma. The alveolar arrangement of the epithelial cells and the anastomosing stellate cells are characteristic.

The report of the pathologists before operation left the surgeon no choice. A complete operation was indicated.

DISCUSSION.

DR. SCHAMBERG said that it gave him great pleasure to hear Dr. Whitham stress the importance of co-operation between the rhinologist and the oral surgeon. It is evident to most men practicing oral surgery that owing to the polymorphous nature of growths about the mouth and jaws that there are many cases that are improperly handled, and this is largely due to faulty diagnosis. Once the character of the growth is properly recognized, the treatment becomes evident to the experienced operator. Benign growths in the mouth require no more than thorough removal without supplemental radio-therapy and without disfiguring resection. Before the use of X-ray as a diagnostic agent a great many more errors were made than today. There are still too many tumors of the mouth that are either temporized with by the inexperienced dentist or physician, and, on the other hand, unnecessarily extensive operations are performed upon benign growths. The giant cell sarcoma, for instance, is the type of growth that is comparatively benign and of inflammatory character or origin, and is readily eliminated by conservative surgery. This has been frequently referred to by Dr. Bloodgood and others and was a point brought out in Dr. Whitham's paper that I was glad to see emphasized.

The number and character of growths that may appear about the mouth are so much greater than other parts of the body and their differential diagnosis from inflammatory and infective lesions so necessary that every possible means available in diagnosis must be called into play. The most accurate and final method being the microscopic examination of a section removed for study.

Dr. Schamberg then showed a large number of slides indicating the appearance of these growths by external photographs of the face, photographs of the interior of the mouth, radiographs and photomicrographs.

DR. HENRY SAGE DUNNING: I have listened to Dr. Whitham's interesting paper with great pleasure. It is a subject which lies very close to the heart of every oral surgeon. I have made a few points and there are several things upon which I do not agree with the essayist.

Regarding epulis, I would say that it most often occurs in middle-aged Jewish people who have neglected their mouths for years. There is generally a very advanced case of pyorrhea present and much calculi around the teeth. The condition in my mind is due distinctly to irritation and trauma and over a period of years. The point which I would like to bring out is that this small gum tumor often occurs during pregnancy, if it has not been thoroughly removed. I have had cases where the growth recurred three or four times and each time the woman was pregnant. I believe the teeth should be extracted and the alveolar process removed and, as a rule, it is a safe thing to cauterize the wound thoroughly with actual cautery.

The doctor speaks about injury causing carcinoma of the jaw. I beliebe that has not been proved and would say in the majority of the cases which I have seen there has been no history of injury.

Regarding the root cyst, I would say that this type of cyst is due to infection from a tooth and it depends greatly in which tooth the cyst is located; whether or not the cyst points or drains towards the palatal or towards the labial aspect of the mouth. The lateral incisors drain palatally on the upper jaw, whereas some of the other teeth drain externally or labially. It depends almost entirely upon the situation of the roots themselves whether they point inward or outward. The cyst naturally develops in the line of least resistance. Cysts of the upper jaw

very seldom break into the antrum. They quite often will encroach upon the antrum and obliterate the antrum by collapsing it, but without seldom rupturing into it. Carcinoma of the upper jaw often shows submaxillary adenitis and I feel sure that the glands should be removed at an early stage to help in any way to cure this case after the removal of the growth. That is to say, it is not enough to remove the primary growth without cleaning out the glands of the neck very thoroughly. Incision of the mandible can very often be nicely accomplished by a rather low incision under the lower border of the mandible extending approximately from the angle to the median line. It is generally unnecessary to split the lower lip and I feel, as a rule, you get a nicer scar if this is not done. I feel that the buccal cavity is the dirtiest cavity in the body and the tissues are probably traumatized and insulted more than in any other region. It is undoubtedly up to the dentist and oral surgeon to detect beginning neoplasms of the mouth and jaws more than anybody else, as often when the general surgeon sees these conditions they are often beyond any hope.

DR. SHEEHAN said: I felicitate Dr. Whitham upon the success of his efforts. Dr. Whitham failed to bring out one essential point, namely, the epithelization of the parts, thereby preventing the formation of scar tissue and contractures. My long association with Major Gillies of London, acting as his assistant, has taught me that no surgical operation is complete if scar tissue formation, on an extensive scale, is allowed to take place. This sort of surgical work has interested me for a long time. I have gained much knowledge tonight frof this admirable paper. In doing this sort of surgery, one's object should be a never tiring search for the optimum technique. A thorough knowledge of the principles of plastic surgery and prosthesis is required and essential if one wishes to obtain the best results. If one finds after a surgical procedure for the removal of such tumors, a loss of mucous membrane, this should be replaced with skin of the Thiersch variety. Scar tissue to replace the loss of mucous membrane should never be allowed to take place.

Quite two years ago, Dr. John F. Erdmann referred to me a woman of fifty years of age, who was suffering from a sarcoma, which had its origin in the spheno-maxillary area. It completely blocked the nasal airway of the right side, broke through the orbit and maxillary wall, producing a hideous deformity of the right face. The growth was attacked by following the method advocated by Moure for the removal of such tumors. Radium needles were applied to the base of the growth, and subsequently on three different occasions. On account of the large area of raw surface produced by the surgical procedure, extensive scar tissue formed. This was a constant source of trouble to her, as many times it became infected, causing an enormous post nasal discharge. This condition was not relieved until the whole of the scar tissue was excised and replaced with skin.

DR. WHITHAM, in closing the discussion, said that Dr. Dunning had misunderstood him on one or two points. He had made the statement that epulis is most frequently seen in early adult life. If the specimen of the growth be examined it will be readily seen that it was impossible to remove it through any other incision than the one he made.

He agreed with what Dr. Sheehan had said about replacing the mucous membrane by plastic methods, but in these cases it was not usually practicable to do the plastic operation at the time. It could be considered at a later date when necessary.

Conclusions Concerning the So-Called Conelian-King Bacillus. Dr. J. J. King.

(*Paper published in full in this issue of* THE LARYNGOSCOPE.)

DISCUSSION.

DR. EMIL MAYER: This is a most important communication, if we mean to make it a matter of record. We are entirely dependent on the laboratory.

The facts are, briefly, that not only Dr. King, but Dr. Mayer, Dr. Hasbrouck and many others received word from the same laboratory that certain cultures contained an independent diplococcus and this was called the Connellan-King diplococcus.

At no time has the discoverer publicly withdrawn the statements then made, and now that Dr. King has determined to either substantiate the claims made seven years ago or, failing in that, to announce publicly that there is no such diplococcus. I think every credit should be given Dr. King for taking a proper scientific stand.

A few years ago, while making investigations in local anesthesia, I found that one of our associates had reported remarkable success in over three hundred cases following the use of quinin-urea. It was the best local anesthetic. I asked the writer if he was still of the same opinion then expressed, and he said no; he had stopped using it for more than two years, but nobody depending on the records could find a single word withdrawing his unqualified endorsement.

This same thing applies to the Connellan-King diplococcus.

Many changes have taken place in laboratory methods since 1915. New discoveries made, and we ourselves might wish to change opinions expressed so long ago. I am therefore quite willing to believe that the statements made as to the existence of an independent organism was made in good faith, and as its originator denies its existence there is nothing left but to do what Dr. King has done—make this denial as public as the original statement was made.

DR. HARRIS: I very heartily co-operate and agree with everything Dr. Mayer has said. I believe that what Dr. King has done tonight is an illustration of what should be done in the interest of scientific work; as Dr. Mayer said, it is not a personal thing. Nevertheless, apart from that, I wish to say very frankly that I think this is a very manly thing for Dr. King to do. While it was the right thing to do, I wish to compliment him on the frank and clear way in which he stated the matter and withdrew any statement he has made of any specific coccus. It makes us think more of him. I have been interested in his paper and in his work, and before we went into the war I did go into the work of proving or disproving the claim made by Dr. King (at the Post-Graduate Hospital). On account of the breaking up of everything because of the war, we never had any written report, but I did have a verbal statement from Dr. O'Neal that they were not able to find any specific diplococcus. That does not in any way militate against what Dr. King has told us tonight of his results from vaccines. I have had the pleasure of seeing some of his cases. At the Manhattan we have had that very result where it never occurred to us that there was any diplococcus at all. It is a great pleasure to be here tonight and to endorse publicly what Dr. King has said.

DR. JOHN J. CONNELLAN: In the early part of 1915, I started some laboratory work for Dr. Jas. J. King and, after a short space of time, began making vaccines from the cultures taken from the throat and tonsils. Almost invariably, the culture showed a gram negative coccus or diplococcus, that grew rather profusely on blood media. The colony had a very slight yellowish or light brownish tinge. At one time I thought the blood media accounted for the color. The organism appeared to me a diplococcus about the size of the micrococcus catarrhalis, the only difference being, the micrococcus catarrhalis is white in appearance. In comparing the organism with the gram negative cocci or diplococci noted in Hiss & Zinsser, 1914, the organism was not, in my judgment, similar to any noted in the above reference. I called Dr. King's attention to the findings principally to learn whether or not the organism was pathogenic to the human.

After the publication of Dr. King's article in the A. M. A., January 13, 1917, the question arose as to whether the organism was a new one or not. I was advised by Dr. Jas. G. Dwyer that it undoubtedly belonged to one of the many groups of organisms that are common inhabitants of

the throat. The organism was tested for pathogenicity with guinea pigs by Dr. Dwyer in April, 1917. Dr. Goode and I were present. The result was negative.

Again I was told that Dr. T. J. Harris had had the organism investigated at the Post-Graduate Hospital and that it very likely belonged to the micrococcus catarrhalis group.

When one is working on a salary, without an endowment or other resources, the cost of research work in bacteriology is a heavy one. I realized only too well that I was in no position to continue the investigation, besides I realized that there was a big possibility that the organism was a common inhabitant of the throat and was non-pathogenic.

I therefore informed Dr. King and several of my friends in the medical profession that I did not intend to use the name Connellan-King, that I had a suspicion the organism belonged to one of the many groups found in the throat and that it was non-pathogenic. The letter I wrote Dr. King, as well as some other correspondence I had with him, has been mislaid or lost. I believe now, as I did then, that Dr. King should have immediately withdrawn his contentions relative to the organism and his linical data.

I further maintain that even should the organism have proven a new one, the fact that it was non-pathogenic should have caused Dr. King to withdraw his contentions. Had he done so, I should have been glad to have helped him in every way possible. Again, if Dr. King did not accept the findings as to pathogenicity, then he should have immediately had an investigation made by others.

Later on I became associated with the Bureau of Investigation Department of Justice, and was therefore able to spend but very little time in the laboratory. I dropped all thought of the organism in question and was of the opinion that Dr. King had done likewise.

Dr. King's account with the laboratory closed on April 28, 1917. I heard nothing from Dr. King until Dr. Higgins sent me a letter addressed to him at his home and written by Dr. King under date of December 8, 1917, in which Dr. King asked Dr. Higgins to call upon him at his office.

On October 11, 1922, I received by registered mail the following letter from Dr. King:

"I am very anxious to have all the data in connection with the Connellan-King diplococcus, as I have learned that there has been a denial made as to the correctness of the existence of such a diplococcus.

"I intend to have an independent investigation made into this matter at my own expense, and you will appreciate the need of exact information so that fairness to both you and myself will result.

"Awaiting your prompt reply, I am

"Yours truly,
(Signed) "James J. King."

You will notice that Dr. King's letter states that a denial has been made as to the existence of the Connellan-King diplococcus. I believe that Dr. King will agree with me when I say that there was a decidedly pronounced denial made over five years ago.

My reply to Dr. King is as follows:

"Your registered letter of October 11 in re Connellan-King diplococcus at hand. I am surprised that this matter should come up again. If you will recall, I wrote you in the early part of 1917 and requested that my name be henceforth not used in connection with any type of bacteria. I was under the impression that no one had the right to use that term, due to the inability to identify the above organism. If any one has used the term, Connellan-King diplococcus, I fail to understand how he could truthfully do so. I have not used it since writing you the letter mentioned above and do not intend to. Furthermore, I still hold to the subject matter contained in my letter sent you in the early part of 1917.

"Very truly yours, (Signed) "John J. Connellan."

On October 27, 1922, Dr. King again wrote me, registered mail, and asked me for a copy of the letter referred to in my answer to him.

I received a letter from Dr. T. J. Harris, in which he states that the Bacteriological Department, Post-Graduate Hospital, has not been able to identify any diplococcus in the culture sent them in the early part of 1917. I cannot recall who did the work and Dr. Harris does not mention a name. I am affixing Dr. Harris' letter to me to this record.

Since the early part of 1917, I have given almost all my attention to fecal findings and have not followed the bacteriology of the throat.

In looking over some literature, I find that Zinsser's latest edition on Bacteriology describes an organism, micrococcus flavus, that closely resembles the diplococcus referred to above. The micrococcus flavus is not described in earlier editions. This last edtion also mentions eight or nine groups of gram negative cocci or diplococci combining approximately 115 odd strains found in the throat.

Being a technician and not a graduate physician has placed me in many embarrassing positions. My aim has been to be an aid to the physician; in other words, I will gladly take up any laboratory problem in which the physician is interested and work it out as far as I am able. This holds especially true in fecal findings. I have always believed that it is for the physician to determine whether or not the information received is of clinical value, that I am in no position to pass upon the value of the findings. In this connection, I take issue of Dr. King's statement, that the reason for this meeting tonight is because I am unable to identify the so-called Connellan-King diplococcus. This same reason held good five years ago.

I should like to ask Dr. King of whom the Board of Bacteriologists he referred to in his paper before the Southern Medical Association, November 12, 1917, in re Gram negative organisms, was composed. Again I should like to ask Dr. King what diplococcus (singular form used in *Medical Record*, February 18, 1920) he referred to when he stated that autogenous vaccines from this organism are of value. Also in the same issue, reference No. 12, what was meant by further observations on Connellan-King diplococcus?

Dr. E. E. Smith: I don't feel that there is much I can add to the discussion. I might say that I have been in touch with Dr. King in regard to his investigation as to the various throat bacteria, and have been impressed with the earnest interest he has had in the matter. I knew nothing until this evening about the character of this controversy. The subject seems to have been pretty well covered, but I do know that he has asked me to make investigations that did not lead to any very definite results. As Mr. Connellan has said, work of this kind is time-consuming; these organisms die out very readily and if the work is interrupted oftentimes it cannot subsequently be pursued to a definite end. We have isolated a great many organisms; we wanted to know what the differentiation was, and we look forward to the day when we shall know more about it.

Dr. King, closing the discussion: In spite of the discussion to the contrary, the facts in my paper have not been controverted. I have invited the freest discussion before medical societies, and have presented the discussion as published in the record tonight. You cannot find any other record except what I have presented.

I believed the statements made by the representative of the laboratory, for it was made also to others, as you have heard. Now and then rumors came to me that the diplococcus did not exist, but the clinical results of the vaccines were uniformly good and I had no convincing statement made to me that the objectors were right. Many things arose since 1917 to make us fail to correct official records—notably the war, in which I had the honor to do my share.

My attention was recently called to the fact that there was no such thing as a Connellan-King diplococcus. I was anxious to clear the matter up, to defend it to the last, if true, or openly deny it if not. I offered to have it investigated at my own expense by thoroughly competent bacteriologists under the advice and sanction of some of the leaders in

laryngology. You know the rest. The discoverer has withdrawn all claims as to the existence of an independent diplococcus, and I have given the matter freely to the medical world to settle the question finally.

MR. CONNELLAN: May I ask Dr. King to answer the three questions that I asked him?

THE CHAIRMAN: The discussion and paper are for the purpose of bringing the record up to date. Dr. King's paper and Mr. Connellan's statements will both be on record. Dr. King records that, so far as he knows, there is no such organism as the so-called Connellan-King diplococcus. Does Mr. Connellan agree with him?

MR. CONNELLAN: So far as I know, there is no Connellan-King diplococcus, for I have dropped the entire thing.

THE CHAIRMAN: From the scientific standpoint, that is what interests the Section and what the Section wants to record.

Frontal Lobe Abscess Following Acute, Bilateral Frontal Sinusitis. Dr. Charles J. Imperatori, New York, and Dr. Edwin C. Fassett, New York.

This patient, H. H., 13 years of age, born in the U. S., had never been ill except that in the spring of 1922 she had scarlet fever. Several weeks before coming under observation she had a furuncle of the nostril. Otherwise the history is negative.

She was first seen by one of us (Dr. Fassett) on July 7, 1922, and at that time her complaint was "Severe frontal headaches for three days. Location, right side mostly, but not very definitely. She has had a grumbling headache for several weeks. Her eyes had been examined about a month previously and reported normal."

GENERAL EXAMINATION.

Healthy, robust girl, color fair. Has photophobia, is frowning; appears to be in great pain. Over the right side of the forehead and upper right eyelid there is an area of edema about the size of a silver dollar. The gait is unsteady. She answers questions vaguely. Temperature normal. Pulse 78.

NASAL EXAMINATION.

Nose: High deflection on the right side with an enlarged middle turb., the latter only coming into view after the application of 4 per cent cocain. It is in close contact with the septum. This region is very sensitive, even after the application of 10 per cent cocain. Some thick pus is seen coming from under the middle turb., only after the cocain application, however. The pain is relieved after the cocain application and suction. LEFT side no abnormalities.

Sinuses: Transillumination shows the right frontal sinus and antrum to be darker than the left.

Throat: Tonsils slightly enlarged, otherwise negative.

Immediate operation was advised, *i. e.*, opening of the fronto-nasal passage and antrum.

Diagnosis: Acute empyema of the right frontal sinus and possibly the right antrum.

Owing to the absence of her mother, I had to defer this until July 10, three days later. Then a submucous resection, a partial turbinectomy and antrotomy was done under local anesthesia. There was some pus in the antrum and a distinct flow from the region of the fronto-nasal passage. Her temperature on admission to the hospital was 100.8°. Pulse 88. Following the operation, there was an increase of the edema over the right eye; the temperature rose to 101.6°, pulse 98.

The patient still remained below normal in her cerebration, still complaining of the right frontal pain, and it was not until four days later that the temperature dropped to normal; the swelling subsided somewhat and she was allowed to go home for further treatment. Suction applied while there was very painful. Her condition did not improve, and it was decided to send her back to the hospital and take more radical steps.

During the night of July 19, the pulse dropped to 60. The pain became worse; patient crying out aloud. A peculiar feature of this scream was

that it came almost every 40 seconds. There was moaning between the screams. Pustula appeared upon the flexer surfaces of the arms and legs; they resembled those of varicella. Dr. N. Del L. L. Fletcher examined the eyes and found a slight haziness of the LEFT optic nerve.

The patient was first seen by one of us (Dr. Imperatori) July 20, 1922. The examination follows:

"She appeared to be in great pain, with interval screams, restless, paying little attention to her surroundings. The temperature was 100°, by rectum, pulse 58. Blood count 11,500 total leucocytosis, and 84 per cent polymorphonuclears. Urine: slight trace of albumen with no casts. Wassermann: negative. A slight Kernig was elicited at this time. There was slight exaggeration of reflexes."

A double radical frontal was done July 20, 1922. Both frontals were filled with pus, the right with thick granulations. Drainage was established through the nose on both sides. The wound was closed with Michel clips. A spinal puncture was done at this time and showed 320 cells; bacteriologically a few pneumococci were found.

The temperature dropped gradually to 99° by July 25. However, pulse also gradually dropped, until it reached 45 on July 27. During this interval, the patient had a day or two when she was considerably brighter and had little pain. On July 27, the pain increased markedly. The leukocytosis was 12,500. Kernig was more pronounced. The temperature by rectum was 99°. We decided a decompressive operation was necessary.

As soon as the patient was under ether, Dr. Fletcher again examined the eyes. Previous to this he had been unable to get a satisfactory inspection, as the patient was very restless and irritable. His findings were the same as before: "Haziness of the left optic nerve."

Opening the wound, the scalp was laid back until the sinuses could be inspected. They were filled with pus and granulations, but no loss of continuity of the posterior or superior walls was observed. The first opening into the frontal region of the brain was made on the left side. Nothing was found except that there was practically no pulsation of the dura. Incision of the dura and search revealed nothing. The second incision was made on the right side over the pre-frontal lobe, about half an inch to the right of the median line and about the same distance above the upper limit of the frontal sinus. There were flaky granulations on the dura, and upon incising it a little serous fluid escaped. Searching soon brought a gush of pus, fully two ounces in volume. The pulse, which before had been 52, now went up to 70. Pulsations of the brain immediately began and the patient's general condition improved.

A tube was inserted into the abscess cavity with others from the frontal sinuses. A button hole was made in the forehead flap to correspond to the cranial opening. No irrigation was attempted. The wound was closed with clips.

Aside from a slight set-back when the tubes were expelled and the wound partly closed over about five days after operation, recovery was uneventful. She was discharged from Dr. Fassett's service at the New York Throat, Nose and Lung Hospital on September 6, though had she not lived at a great distance, she might well have gone out ten days before.

Seen December 27, 1922, she has gained 25 pounds. Her mentality, described by her aunt, as it was before the operation. She appears normal in every way.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

December 27, 1922.

Unusual Mass of Lymphoid Tissue Around Tonsil Fossa Following Tonsillectomy. Dr. Wolff Freudenthal.

The patient was a youth of sixteen, who had come under observation six months previously complaining of a running ear and of his voice. His voice had not changed and he had a typical eunuchoid voice, which yielded to mild treatment. Examination showed that the tonsils had been removed, and back of that, as well as above and below, especially on the right side, was a mass of neoplastic tissue of extraordinary size. A good deal of this was removed from the right side with forceps and tonsil punch, but a big mass still remained.

Dr. Freudenthal said he had never seen just such masses before, and did not know whether or not it had developed after the tonsillectomy, which had been performed by another surgeon. He had considered Hodgkin's disease, but it was not that. The young man's Wassermann test was negative. The examination of the blood showed a leukocytosis, with a moderate relative leukocytosis. A specimen removed showed microscopically nothing but lymphoid tissue. It was a question as to whether or not the whole mass should be removed in toto, which would be very easy, but it might leave too much scar tissue.

DISCUSSION.

DR. HELLER said he did not consider the case so unusual as the program stated. He had seen some of these cases, perhaps not quite so well developed as was shown on the left side of the pharyngeal wall in this instance. In most of the cases he had seen the throats were normally very large, and he had wondered whether the growth was not an attempt on the part of nature to compensate for the removal of the tonsil. It seemed to be made up of lymphoid tissue. In the cases he had seen there were no symptoms whatever until the patient looked into the throat and, finding something abnormal, developed mental symptoms.

DR. FREUDENTHAL said that the patient presented had a running ear.

DR. HELLER replied that he had never seen any cases with running ears excepting where they had already been there. In his opinion, the condition was more physiological than pathological.

DR. KNIGHT told of a similar case operated upon by him about three years ago, referred by Dr. W. D. Duckworth. At the time the child, who was a girl about ten years old, was seen, there was evidence of diseased remnants of tonsils on both sides, and on the right side of the pharyngeal wall, posterior to the posterior pillar, some lymphoid tissue was seen. A tonsillectomy was performed a few months later, and it was noticed that the lymphoid tissue had markedly increased in size and presented definite crypts filled with cheesy material. Had this structure not been outside of the fossa one would have thought the tonsil incompletely removed. There was some post-nasal discharge which cleared up under suction and irrigation, with resultant improvement of the condition of the throat, but the lymphoid tissue remained, its crypts still diseased. Dr. W. Duckworth, now Associate Roentgenologist to the Post-Graduate Hospital, saw the case again, and it was decided to treat it with the X-ray. This was done, with marked improvement. The case has not been seen for several months and its present condition is not known.

DR. FORBES felt that the proper treatment of this hypertrophied tissue was very important, especially when dealing with a toxemia. In a few of the cases in which he had removed the tonsils, apparently completely, there had been a reproduction or a hypertrophy of lymphoid tissue both laterally in pharynx or at the base of the tongue, such as seen in Dr. Freudenthal's case—these areas may be and are foci of infection and consequent toxemia. Cautery had proved best for treatment of these cases.

DR. LEDERMAN said that Dr. Hays had reported a number of cases where the lymphoid tissue developed after a tonsillectomy. It seemed to

be nature's method of furnishing secreting tissue to take the place of that removed.

DR. FREUDENTHAL said that if it was nature's effort to make good for what had been removed, that fact should be remembered, and we should be more careful about doing a tonsillectomy than we are nowadays. He could not agree with Dr. Heller's idea that the condition was largely physiological. These masses were quite unusual, especially that on the right side where the ear was discharging. A very large piece had been removed from there to be examined. He had not seen the report of Dr. Hays' cases which were in the same category. It was very interesting to hear of the cases where crypts had formed, but he did not think that this was like Dr. Forbes' cases, where the growth was at the base of the tongue. As for the toxemia, that was a very important matter.

Laryngeal Tuberculosis. Dr. Wolff Freudenthal.

The patient was a man of 32, a painter by trade, who showed advanced laryngeal tuberculosis with very little involvement of the lungs. When first seen it was thought to be a mild case of lead poisoning, but it proved otherwise. Examination of the larynx showed the epiglottis to be infiltrated with a deep ulceration on the left side and smaller ulcerations all over the larynx; the vocal cords showed some infiltration, which spread into the lumen of the larynx, and there was considerable edema. The patient had a slight dyspnea, and it was thought best that a tracheotomy be performed. But in this instance the patient decided to wait, and he was treated with orthoform emulsion. After Dr. Freudenthal left for the summer, the patient was cared for by his family physician, and in September he was somewhat improved. The dyspnea had disappeared and he could breathe without effort, yet the infiltrations were about the same as before. After this he improved steadily under somewhat different treatment, and with continued care of the nose and pharynx, keeping them clean, he felt very well indeed. Suddenly, however, he lost his wife and I did not see him again for weeks. When he returned, he showed the same picture as in the beginning. The lumen of the larynx being very much narrowed down, again the question of tracheotomy was considered, but it was thought best to wait. He felt much pain on swallowing.

The drugs employed were mostly orthoform emulsion, and latterly chaulmoogra oil, which has long been used for leprosy, the essential active principle being an ethyl ester. It is now marketed under various names. Dr. Freudenthal used the one called chaulmestool. Combined with the emulsion, it seemed to work very well in this case. The patient himself liked this as well as the treatment by the high frequency current applied externally. He asked for both himself, as he found that they relieved him greatly.

At one time his tonsils did not look well and their removal might have been considered by many others. But this did not seem advisable, as a somewhat similar case had terminated fatally after removal of the tonsils; six weeks after the removal of the tonsils a secondary eruption appeared all over the tonsils, in the pharynx and larynx, parts that had been free previously. Having seen such other cases, Dr. Freudenthal said he would think it over a long time before removing the tonsils in such t. b. patients. A strange feature about this case was that the man felt well and was occupied with his work as a painter all the time while he was being treated.

DR. FREUDENTHAL replied that the further up the lesion, the stronger the electro-cautery could be employed, for there was no danger of edema. In another case now under treatment which shows cicatrization and which seemed to be specific, he was very careful to use a very mild application, and use it oftener. He could not tell Dr. LeWald how great was the lung involvement, but thought that only the right apex was involved. The pulmonary examination was made by another man also.

DR. IMPERATORI inquired whether Dr. Freudenthal applied the cautery only to the surface or whether he did what was formerly called an igni-cautery, and if that, how deep did he apply it.

DR. FREUDENTHAL said he plunged the cautery into the tissue until he felt some resistance, though further down in the larynx he was very careful.

DR. FORBES inquired how often and to what depth did Dr. Freudenthal feel justified in using the galvano-cautery in treating laryngeal tuberculosis.

DR. LEWALD expressed much interest in the association with the pulmonary lesion, which Dr. Freudenthal stated to be very slight, and asked whether it was an old hilum lesion which he had healed in childhood, or whether there was some degree of activity present. He had seen cases, for example, of tuberculosis of the bowel in which there was no Roentgenological evidence of tuberculosis elsewhere.

A Case of Tuberculosis of the Larynx. Dr. Geo. D. Wolff.

H. F., male, 61 years of age, born in Russia.

No history of tuberculosis or malignancy in the family. Resident of the United States for 20 months. Lived in Canada previous to this for 9 years.

About 9 months ago, patient noticed increasing hoarseness and hysphagia, and came to the Harlem Out-Patient Department on February 1, 1922, complaining of aphonia and marked dysphagia. The patient was fairly well nourished and in comparatively good health otherwise. An indirect examination of the larynx was rather unsatisfactory and no land marks of same could be marked out. The whole organ presented a pronounced mass of infiltration involving the arytenoids, ventricular bands, aryepiglottic folds and to a lesser extent the epiglottis. A tentative diagnosis of tuberculosis laryngitis was made and the patient referred to the T. B. department for diagnosis. He was returned with the report of pulmonary involvement of both apices and a positive sputum. He was treated with the galvano-cautery and after a second application the infiltration began to subside almost immediately with the disappearance of the dysphagia and a great improvement in voice. At the present time his vocal cords can be clearly seen and all the landmarks of the larynx made out. At the third application of the galvano-cautery the tissues felt quite hard and the question then arose as to whether we were not dealing with a malignancy. A piece was removed, but no evidence of malignancy was seen by the pathologist. A Wassermann of the blood is negative. Because of this patient being a resident of New York for but a short time, he was not accepted in any of the city institutions. This will therefore give us an opportunity to watch this pathological condition in the outpatient department as an ambulatory case. The points of interest in this case are:

1. The comparatively mild involvement of the lungs and the very marked involvement of the larynx.
2. That the laryngeal condition was the first to present subjective and objective symptoms.
3. The prompt and favorable response of this condition to the galvano-cautery.

Angioma of the Larynx. Dr. George D. Wolff.

X. Y., age 42, born in Russia, male, merchant by occupation, married 11 years, no children.

F. H.: Father and mother alive and well. One sister died at the age of 26 of tuberculosis. One brother died at the age of 38 from cerebral hemorrhage. One sister died at the age of 40 from nephritis. One brother alive and well.

Diseases of childhood: Measles and smallpox at the age of 4. Habits: Good.

P. P. H.: Fourteen years ago had cough, lost weight, night sweats and was at that time diagnosed as a double apical involvement. No pulmonary hemorrhages at that time. Sputum was positive for tubercle bacilli for

*Case presented at the New York Academy of Medicine, Section of Rhinology and Laryngology, December 27, 1922.

five months. No history of any venereal diseases. Three years ago he had a lame right leg, which was ascribed by the attending physician as due to ulcerative enteritis (?) ("Abrams'" method). After this cleared up the serological examination was 4 plus positive for lues, which, after intensive specific treatment, became negative and has so remained until the present date. The patient was also subject for a long time to frequent colds in the head and occasional sore throats.

Present complaint dates back to July, 1922, four months previous to the date when he was first seen. Patient suddenly expectorated about a tablespoon of bright red blood. He believed this to come from the throat. The same recurred a week later following bathing in the ocean. His chest was examined at the time by the attending physician, who could not find in the chest the reason for the hemorrhages. From then on the patient had hemoptysis every second or third day, varying in intensity, but never of any alarming degree, up to the time of the examination.

On examination of the larynx on November 13, 1922, on high phonation, there was found a small sessile neoplasm, larger than a hemp seed, somewhat elongated, the surface being nodular, bluish-red in color, resembling a raspberry in appearance. This neoplasm was situated at the anterior commissure, covering about one-fourth of the anterior portion of the left vocal cord. On phonation it prevented full adduction of the vocal cords. The larynx as a whole was congested and the ventricular bands slightly edematous.

On November 17, 1922, under local anesthesia, by the aid of a Jackson anterior commissure laryngoscope, a piece of the neoplasm was removed and submitted to Dr. E. P. Bernstein for examination, who reported as follows:

"The examination of the tissue removed from the larynx of X. Y. showed the following:

"The surface epithelium is normal.

"The submucosa is occupied by the loose connective tissue net work in which are a few small round cells and numerous thin-walled blood vessels.

"There is no evidence of malignancy or tuberculosis.

"Diagnosis: Angioma."

There was moderately active bleeding after this procedure, which was easily controlled by the galvano-cautery. As a result of this, the hemoptysis ceased to recur. On November 27, after having ascertained the nature of the neoplasm, the galvano-cautery was reapplied.

DISCUSSION.

DR. WOLFF said, in closing the discussion, that in his opinion the galvano-cautery ought to be used a great deal in this disease. At the Riverside Hospital, where there are always a number of cases of tuberculous laryngitis in all degrees, those patients who submitted to the galvano-cautery treatment always showed marked and rapid relief. There they used the method about once in two or three weeks, plunging it in until it reached the cartilage, about two or three punctures at a time. He has never seen any other remedy give such rapid results. He then cited a paper in a recent issue of the *American Review of Tuberculosis*, giving a thorough review of the subject. The order of that article has divided a number of cases into series, each group receiving a different type of treatment; and he comes to the conclusion that the galvano-cautery afforded the best results. There are both clinical and experimental evidences to support his view.

DR. FREUDENTHAL said there was absolutely no danger of doing any damage in using the galvano-cautery, and that one should go as deeply into the tissue as to reach the root of the ulceration. But that need not be done in one sitting.

DR. IMPERATORI said hat some eight or ten years ago he had had some experience at Riverside Hospital in the use of the galvano-cautery, but unfortunately the results were not as satisfactory as those reported by Dr. Wolff. It is possible that different technique is being used, or that the cases are selected ones, or the character of the cases that are at Riv-

erside has materially changed in past few years. At that time, most of the patients were in arrest—being held as menaces to the community.

DR. LEDERMAN asked whether Dr. Wolff, after using the galvano-cautery, had ever tried applying trichloracetic acid to limit the discomfort. Many years ago Dr. Gleitsman had suggested this method, and he himself had found that it limited the reaction and resulted in the formation of a dry eschar, which after coming away left the condition practically healed.

DR. FREUDENTHAL said that he employs the emulsion referred to by Dr. Lederman. It relieved the pain and left the patient at ease so that he felt very little discomfort from the reaction.

DR. MACPHERSON cited a case in which there was a severe reaction, with infection and edema following the use of the galvano-cautery, showing that perhaps the method was not entirely without danger. He would keep such a patient under observation for twenty-four hours after treatment, in view of the possibility of a secondary edema.

Early Carcinoma of the Larynx. Dr. George D. Wolff.

H. S., male, 42 years of age, born in Russia, married 21 years, 5 children, no miscarriages, presser by occupation, smokes from 4 to 5 cigarettes a day, does not consume any alcoholic beverages. Had pneumonia at the age of 20 and again at the age of 28.

Diseases of childhood: He remembers only whooping cough.

Family history: Father died at the age of 65, cause unknown. Mother died at 40, cause unknown. Two sisters alive and well. Five brothers and two sisters died from diseases of childhood, causes unknown.

Ten years ago had pain in chest, cough and loss of weight. Was diagnosed at one of the health department clinics as tuberculosis (exact location of pulmonary involvement not elicited). Was sent to Bedford Sanitarium and after 7 months' stay at that institution he was sent back as an arrested case and has since been working in a factory under the care of the committee for the Jewish tuberculous and enjoying good health.

Present complaint: About two years ago he noticed an intermittent hoarseness which lasted for two or three weeks at a time and which improved on its own account. About two or three weeks ago he felt pain in the larynx which was more or less constant and which was worse on swallowing. On November 28, 1922, he was examined at the Bronx Hospital Dispensary and the larynx showed a small, wart-like growth in the inter-arytenoid space. No interference with the mobilization of the cords was observed. On account of the previous history a tentative diagnosis of tuberculosis of the larynx was made and a specimen was removed by direct method, followed by the galvano-cautery. The report of two pathologists (Drs. Rohdenburg and Felsen) was early carcinoma of the larynx. The galvano-cauterization was repeated ten days after the first treatment, and all the tissues that looked suspicious were destroyed. The immediate result of this procedure was the disappearance of dysphagia and improvement of voice.

Wassermann reaction of the blood is negative.

DR. HURD asked if he was correct in understanding that the growth was in the posterior commissure, and said that in such a case he thought any one would be up in the air by taking out a small piece and submitting it to a pathologist, and operating or not upon his say so. In his opinion, any operation performed should be a total laryngectomy.

DR. LEDERMAN said that such cases were very important and required very careful consideration. He then cited a case which he had reported, of a man about 55 years of age who had complained of hoarseness for a year or more. There existed a rather localized mass on the posterior third of the vocal cord which gave infiltration of the right false cord. Macroscopically it did not appear to be malignant, and there were no glandular manifestations. The man had a negative Wassermann reaction and also received a series of injections of Enesol before coming under Dr. Lederman's care. While hesitating at a definite conclusion, before having done anything surgically Dr. Lederman advised a course of iodin and that the patient should have further expert opinion before losing his

larynx and taking the chances of so serious an operation. The patient saw two other specialists of extended experience and also a surgeon familiar with laryngeal lesions. They all agreed that the macroscopical appearance of the growth indicated an epithelioma of the larynx. Accordingly the question was put up to the man whether he would have a piece taken out for examination, with the understanding that he must be prepared for a hemilaryngectomy or a laryngectomy if the growth proved to be malignant. It was finally decided to first try a further course of iodide, as suggested by Dr. Lederman, and this resulted in the entire disappearance of the growth.

In such cases the diagnosis of one individual, without definite clinical manifestation and microscopical corroboration, cannot be entirely relied upon, and a laryngectomy is too serious an operation to be undertaken without very grave consideration.

DR. WOLFF, in closing the discussion, said frankly that he did not know what to do in this case. Clinically, this larynx does not look malignant. Two pathologists, however, made a diagnosis of early carcinoma of the specimen removed. He wondered whether this case wouldn't belong to the class that Dr. Okada speaks of in a recent article in the Annals of Otology, Rhinology and Laryngology, saying that early cases can be cured by endolaryngical methods. The patient is not sick enough to consider any radical surgical interference and radium will probably be resorted to. He hoped he would be able to show this case again some years later as cured.

Frontal Lobe Abscess. Dr. Imperatori and Dr. Fassett.

DR. IMPERATORI said that in his opinion shortly there would be very little deformity and very little evidence of the operation.

In another case under examination, following a fulminating ethmoiditis, he would be inclined to go in on the side opposite to the choke disc, provided there were no other localizing symptoms. There was no choked disc in this patient—the disc was slightly blurred.

The remarkable thing about this case is that this child had pneumococci in the spinal fluid and yet recovered.

This matter—frontal lobe abscess—had been discussed with some neurologists, purely from a speculative standpoint as to what would happen, eventually, in these cases, and they concluded that most likely nothing would happen.

DR. MARK GOTTLIEB congratulated Dr. Imperatori on the result, and said that any one who does intra-cranial surgery is sure to run up against some intra-cranial infection from the sinuses of the nose. He then cited an instance in which he curetted the fronto-nasal duct, and two days later the patient got up a meningismus, from which, however, he finally recovered. He did not know how much the operation itself had to do with the intra-cranial manifestations, but these cases should be considered very carefully before curetting in that area. He had seen the same thing reported a number of times.

DR. SIEGMEISTER inquired about the examination of the pus and whether the pneumococcus was found.

DR. IMPERATORI replied that he could not answer that question, for he was under the impression that the pus from the abscess had not been examined.

However, this statement should be corrected, for he was informed later, by Dr. Fassett, that pneumococci and streptococci were found in the pus from the abscess.

The original lumbar puncture was done with great ease—60 to 80 drops to the minute. About 5 c. c. were collected and the fluid was clear. At the second operation, in order to check the findings and have further data, a dry tap resulted after 8 or 10 attempts. Dr. Imperatori said that he had always felt that a dry tap meant that the needle was not in the spinal canal, but he felt that this time he was in the canal and a resultant dry tap.

The child was operated upon at first because the extensive frontal sinus condition seemed sufficient to produce all the symptoms. When these symptoms persisted and were not relieved the indications were certainly pointing to some condition located subdurally. A very careful inspection of the frontal sinus wall was done at the first operation and again at the secondary operation. The sinus walls were apparently normal, and no communication posteriorly or superiorly could be seen. On reflecting back the tissues over the right frontal eminence, an area of bone was found that was necrotic. This was removed and granulations were found on the dura.

All the membranes were adherent, but the dura was not adherent to the inner table. There was considerable protusion of the brain substance into the bone wound and no pulsations were felt. Using a Gifford's brain searcher and entering the brain in a direction backward, downward and inwards, at a distance of 3 c.m. the abscess cavity was entered and about two ounces of pus was evacuated.

Apparently the girl's mentality has not changed. She was slightly backward for her age before the appearance of this trouble. How the abscess got there is a question. Was it due to the previous operation? It was not so very far inward from the necrosed area of the frontal bone. Could it be possible that the infection traveled up the sheath of the first nerve? It would seem very difficult to say.

Dr. McCullagh said that the abscess could very easily have followed thrombophlebitis and cited a case of frontal lobe abscess following an injury, which he had reported some years ago, which broke through into the frontal sinus. At that time he could not understand why a necrosis of the bone should take place; why instead of the abscess rupturing into the soft tissue of the brain it should cause a necrosis of the posterior wall of the frontal sinus, but Dr. Eagleton explained it by saying that there was an intimate vascular and nutritional relation between the frontal bone and the dura, and that the pressure of the abscess could cut off the blood supply, and necrosis ensue. It might be that the necrosis in Dr. Imperatori's case was due to a similar cause—the shutting off of the blood supply by the pressure of the abscess—the abscess being due to a thrombophlebitis.

Dr. Freudenthal said that it seemed to him that the frontal sinus over the frontal lobe must have been infected from the beginning, and asked why the frontal sinus was not operated upon right away.

Dr. Imperatori explained that it was opened for drainage.

Dr. Freudenthal said that he had seen many frontal lobe abscesses, *i. e.*, six or eight, and in all the cases where the abscess affected the lobe itself the patient did not recover. Of course Dr. Imperatori's was a prefrontal sinus case, and it was very fortunate that the girl recovered.

Results of Thyrotomy for Carcinoma, Done Fourteen Years Ago. Dr. L. M. Hurd.

Mr. Adams, a man of 57, in perfect health without significant antecedants, had been hoarse, not increasing much nor very severely, for two months. No pain, though some tenderness could be elicited over the region of the left thyroid cartilage.

From the intra-laryngeal growth which had the appearance of malignancy, a fragment of considerable size was removed from directly over the greatest prominence, about the middle of the left cord, the whole protuberance being about the size of a large pea. Microscopically examined, this was seen to consist wholly of newly formed fibrous tissue in which there were a few racemose glands.

Notwithstanding the negative findings of the microscope, complete excision by thyrotomy was performed and tissue of the size of a bean, including the growth at its center, was removed. Sectioned and stained, a nest of atypical epithelial cells was seen at the center with an area about the size of a French pea. The former mark of the forceps could be seen at one point and it was quite apparent that none of the adven-

titious growth had been included in its grasp. The cells sprang from the basal layer of the epithelium and infiltrated to some extent the lymph spaces of the subjacent stroma, but in other places were sharply defined by a fibrous periphery from the loose or normal stroma. It was this periphery which had been encroached on by the intra-laryngeal forceps.

While it is impossible to say how far along the lymph spaces the epithelial cells had progressed, as the topography of the tissue was not completely discernible, the small size of the central area, the fact that the growth is of a type and is springing from a locality of the surface epithelium usually furnishing cancers of a low degree of malignancy, it is permissible to hope for a better prognosis than is usually warranted in such cases.

Micros. diagnosis: Basal celled epithelioma. November 22, 1909.

DISCUSSION.

DR. FORBES said that the Section owed thanks to Dr. Hurd for presenting this case. Many radium cures had been reported with lapse of only a year and a half, but here was a case that had stood the acid test of fourteen years.

New Growth of Nasopharynx for Diagnosis. Dr. W. M. Siegmeister, through the courtesy of Dr. Harris.

The patient presented herself at a rhinological clinic, complaining of sore throat. On close questioning she revealed that she was completely deaf, with a good deal of pathology in the epipharynx in the region of both ostia of the eustachian tubes.

M. D., an Italian woman, 42 years of age, married 21 years, has one child in good health, 20 years old. One child 7 years of age died eleven years ago of unknown cause. She has had one miscarriage, nine years ago, and has not conceived since. She had no sickness until two years ago, when she began to complain of indefinite pain in the throat, from which she has been suffering ever since. For the past year she has been totally deaf. This deafness set in very suddenly. There is no history of any otitis.

The examination revealed a normal septum, with the turbinals on both sides normal. Posterior to the turbinals there is a wide fibrous band like a curtain closing the choana from the epipharynx completely except for two arched symmetrical openings on either side of the septum, on a level with the upper border of the inferior turbinal through which a No. 8 French catheter could be posted. On posterior rhinoscopy the septum and the inferior turbinals can be seen, but not the middle or superior turbinals—only the wide fibrous band. Pharynx, tonsils and larynx negative.

The ear examination showed both membrana tympani normal in appearance, retracted, no perforations.

Functional examination: Conversation not heard ad concham; low and middle tones not heard by air conduction. She hears acoumeter ad concham and C4 5/00, Galton whistle 2.3. Bone conduction nearly normal in both ears by all forks. Vestibulum: All reaction normal, showing a tubal deafness.

Wassermann reaction, xxxx.

The interesting part in this case is the diagnosis. While the Wassermann reaction is positive, it does not look like a gumma. It is bilateral, symmetrical on both sides; that would rule out neoplasm. It does not look like T. B. C. or rhinoscleroma.

The case is presented without further study, that it may be seen before treatment, as the picture may change by next month after treatment has been instituted.

DISCUSSION.

DR. FORBES said that the growth did not look like rhinascleroma nor like tuberculosis, and he was inclined to feel that it might be a tertiary lesion.

Rhinoscleroma of the Nose. Dr. T. J. Harris.

The patient was a Russian woman, 26 years of age, a housewife by occupation, first seen by Dr. Forbes a year ago, when she came to the clinic complaining of difficulty in breathing through the nose, especially on the left side, and of pain and frontal headaches for nine years. She had had several intra-nasal operations. The Wassermann test was negative, and a specimen was removed by Dr. Forbes and sent to the laboratory. This was reported to be rhinoscleroma, the Mickulicz cells being found.

The patient was transferred to the radium clinic under Dr. Willis, and since then had received seven applications of radium, the last under date of December 8. From July until December she stayed away of her own accord because she felt so much better, but returned because of some pain and some soreness in the larynx. Examination at the time of presentation showed free breathing space, with, however, a decided abnormality on the left side as compared with the right,—a very characteristic picture of thickening on the left side.

Of particular interest is the value of radium in such a case. As Dr. Guntzer has shown, the X-ray has been used with much benefit in some of these cases.

The disease is indigenous in Poland, and has spread thence into Hungary and Germany, and also into Egypt and India. In 1909, only sixteen cases had been reported in this country. The condition in the larynx is regarded in Europe as uncurable. Tracheotomy usually relieves the patient for a time, but only for the time being.

DISCUSSION.

Dr. Harris said that in this connection he would like to report briefly of the findings in a large, stout woman who was presented at the Section a month ago for a deposit in the posterior commissure. In the discussion Dr. Mayer suggested that it might be a case of rhinoscleroma. A section was removed and sent to the laboratory, which reported that it was not rhinoscleroma, but pachydermia, as it was diagnosed at the time.

Rhinoscleroma. Dr. H. H. Forbes.

The patient, E. F., was a woman 43 years of age, who has been in this country for 18 years. Her trouble began when she was about sixteen years of age, when she suffered from nasal obstruction and was operated upon in Austria. After coming to this country she had no treatment whatever, until she presented herself at the clinic in 1919, with marked external thickening, as well as a contraction of both nasal fossae. That is a feature different from the other cases presented tonight. There was no ulceration of the mucosa. A specimen examined presented the true picture of typical rhinoscleroma.

The patient had treatment for a time in the radium clinic and then disappeared from view, but returned in 1921. Another section was then taken for diagnosis, and this time it did not show the characteristic picture of rhinoscleroma as before, but only a chronic inflammatory and scar condition. In December, 1922, she had some return of the trouble and returned to the clinic, and was again given radium treatment. On December 8 the doctor made a note that there was a partial return, but the infiltration was much less than when seen before.

There is decidedly more room now than when Dr. MacPherson made the note. The reason for taking a second specimen in 1921 was to give room for the application of a larger capsule of radium. The case has been decidedly improved by the radium treatment.

Pathological report—Gross: Specimen comprises two thin yellowish masses the size and shape of beans. One is hard and furrowed on the surface and the other soft.

Microscopic: The sections are bordered by squamous epithelium which shows irregular hyperplasia, keratosis, and projections which dip into the supporting stroma. The stroma is composed wholly of small capillaries which are ensheathed with plasma and polynuclear cells. Numerous small pink-staining hyaline bodies or cells are seen. Certain large,

clear, oval cell-like spaces with related nuclei show a lacy structure and together with the hyaline bodies suggest rhinoscleroma. The picture is not convincing—there is no sclerosing fibrosis evident.

Diagnosis: Chronic infiltration, possibly rhinoscleroma.

DISCUSSION.

DR. G. ALLEN ROBINSON said that five cases of rhinoscleroma had been treated in the Radium Clinic of the Post-Graduate Hospital under the supervision of Dr. George Stuart Willis. All these cases gave a negative Wassermann and were microscopically as well as clinically rhinoscleroma.

Case No. 80, Mrs. E. F., Polish, admitted on November 30, 1919, has been reported by Drs. Forbes and MacPherson. There have been twenty-eight treatments and approximately 2,800 mh. hrs. given. The nasal obstruction has been complete for twenty years, being partially relieved about six weeks after the first treatment. The first three treatments consisted of an application of 200 mg. at a distance of one inch one hour on each side of the nose. December 2, Dr. MacPherson made an opening into the nares so as to be able to insert a twenty-five mg. tube into each nostril for a period of one hour, the screenage being one-tenth mm. of gold. This patient has shown marked palliative improvement. The reason for the large number of treatments given was because of the limited supply of radium available at that time, and the use of radium tubes instead of needles. The tendency now is to use radium needles inserted into the growth, the intensity of which is four to seven times that of a surface application.

Case No. 298, Mrs. M. K., Russian, age 25 years, presented by Dr. Harris, showed a circular annular contraction of both nostrils, but mainly the left. The patient was very much improved.

Case No. 497, Russian, Mrs. Ida S., admitted February 15, 1922, presented by Dr. Lovell, had been treated entirely with radium needles because of the nodular form of the growth. The case showed the most marked improvement. At the last examination only a small granular mass was found in the floor of the left nostril.

Case No. 149, Mr. P. D., age 28 years, Polish, admitted March 3, with complete nasal obstruction for a duration of ten years. Nasal breathing has been established. The total number of mg. hrs. has been 1,000. The last treatment was in April, 1922.

Case No. 175, Mr. W. A., age 41 years, Polish, admitted April 19, 1920. Beginning nasal obstruction seven years ago. Total obstruction for two years preceding admission to clinic. Case advanced, but palliatively improved following radium treatment in that the obstruction is relieved. A total number of twelve treatments and 1,200 mg. hrs. given.

Case No. 80, reported by Dr. Forbes, showed under the microscope a typical case of rhinoscleroma. A drawing made by Mr. Bosse, the medical artist at the Post-Graduate Hospital, was shown on the screen.

Briefly the pathology of rhinoscleroma is as follows: The tissue consists of a loose reticular network of branching fibrils in which are found very large vacuolated cells containing B. rhinoscleroma. The bacilli are short rods and may or may not be encapsulated. There are many plasma cells present as well as occasional Russell bodies.

DR. MAX UNGER called attention to Dr. Wright's paper, in which he proved that the so-called Frisch bacillus was identical with the Friedlander bacillus and that the use of the term Frisch ought to be discouraged and the term Friedlander bacillus substituted.

DR. MACPHERSON said that he had seen most of Dr. Guntzer's cases at the Manhattan Eye and Ear Hospital several years ago. They were treated by vaccines and the X-ray. No cases that he had seen showed results comparable with that of the radium as demonstrated by the cases shown tonight.